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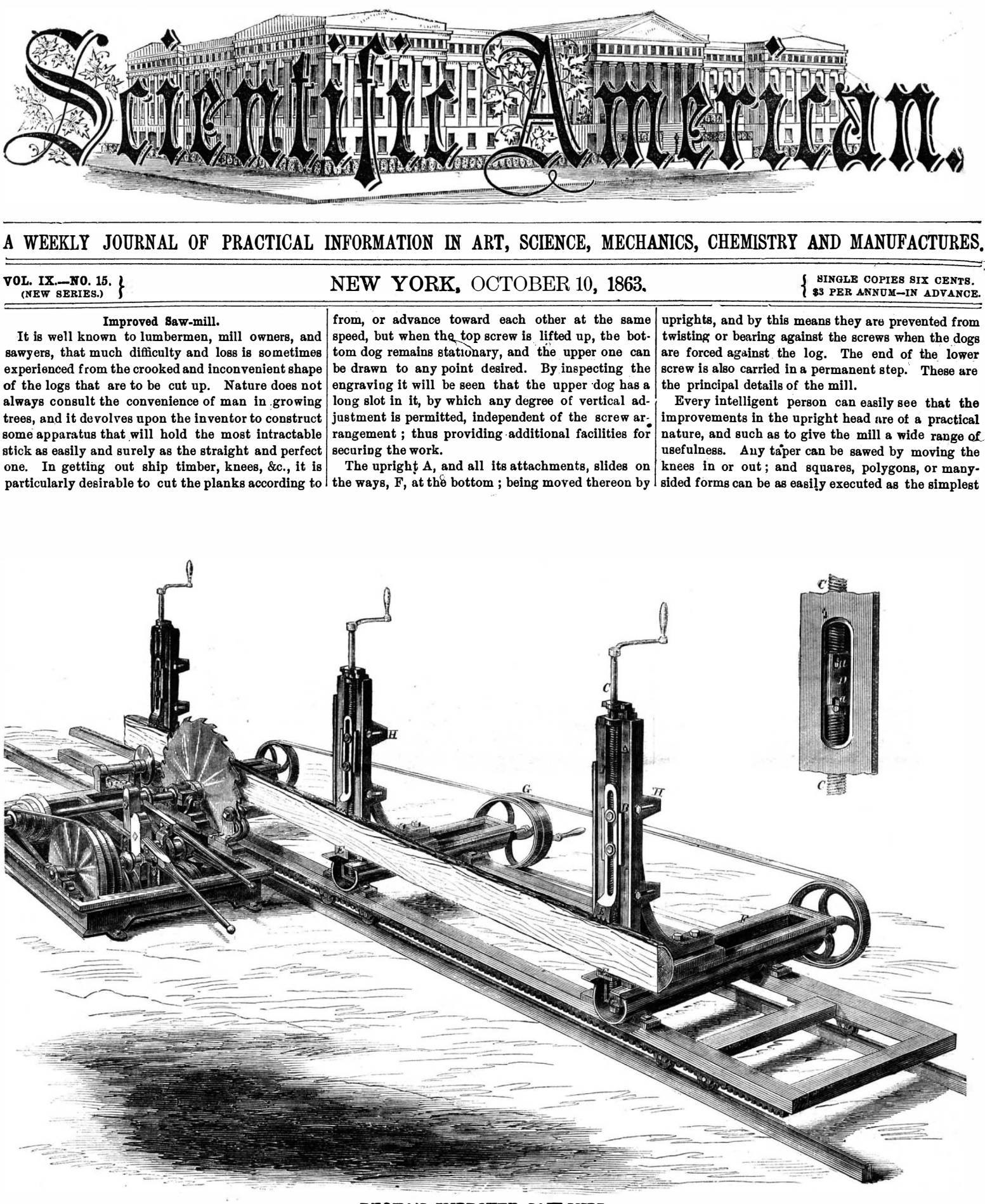
Improved Saw-mill.

It is well known to lumbermen, mill owners, and sawyers, that much difficulty and loss is sometimes experienced from the crooked and inconvenient shape of the logs that are to be cut up. Nature does not always consult the convenience of man in growing trees, and it devolves upon the inventor to construct some apparatus that will hold the most intractable stick as easily and surely as the straight and perfect one. In getting out ship timber, knees, &c., it is particularly desirable to cut the planks according to the natural curve of the wood, and in the ordinary saw-mills, the operation of securing the log is tedious and involves a great expenditure of time. In the accompanying engraving we present a view of a new and improved chuck, or dog, whereon the most obstinate and awkward stick can be as quickly set in place as a straight and fair one. The correctness of this assertion will be apparent by perusing the subjoined description. The upright casting, A, has a sliding block, B, upon it, which is worked by right and left screws, C; these screws have a peculiar connection, which is shown in an enlarged form in the side figure. The tubular sleeve, D, has two slots, *a*, one in each end, which receive pins in the ends of the screws. When the upper screw is pushed down into this slot, both screws turn, and the dogs, E, recede from, or advance toward each other at the same speed, but when the top screw is lifted up, the bottom dog remains stationary, and the upper one can be drawn to any point desired. By inspecting the engraving it will be seen that the upper dog has a long slot in it, by which any degree of vertical adjustment is permitted, independent of the screw arrangement; thus providing additional facilities for securing the work.

The upright A, and all its attachments, slides on the ways, F, at the bottom; being moved thereon by a screw and hand wheel, as all other machines of that class are. The carriages may all be moved at one time by the central wheel, G, or the belts can be speedily thrown off, and either one set at varying distances from a straight line, to suit the nature of the work. The dogs also have an offset in them which enables the sawyer to set lumber intended to be re-sawed, with the greatest facility. The gage, H, is attached to the upright A, by means of screws, and the slots permit of movement in or out as circumstances require. It will be found useful in re-sawing or slitting lumber, and also for guarding the log from contact with the dogs while running it on, or the carriage back. The nuts in which the right and left screws work have grooves in them which fit accurately to metallic guides, I, on the edges of the uprights, and by this means they are prevented from twisting or bearing against the screws when the dogs are forced against the log. The end of the lower screw is also carried in a permanent step. These are the principal details of the mill.

Every intelligent person can easily see that the improvements in the upright head are of a practical nature, and such as to give the mill a wide range of usefulness. Any taper can be sawed by moving the knees in or out; and squares, polygons, or many-sided forms can be as easily executed as the simplest clapboard. For sawing fence stuff, these adjustable dogs are very useful, and will save a large amount of lumber that would otherwise be lost, through the impossibility of holding it securely in a convenient manner for work. Ship knees have been cut on this machine, and other work of a similar character not usually done upon ordinary circular saw-mills. Mr. Hezekiah Alberts, proprietor of a large saw-mill near Hackensack, N. J., has used these improvements for a long time and is greatly pleased with them. All kinds of ship and other timber have been cut by the aid of these improvements.

A patent is now pending on this invention through the Scientific American Patent Agency. Further particulars may be obtained by addressing the inventor, E. B. Requa, care of C. Barnum, 11 Dey street, N.Y.



REQUA'S IMPROVED SAW-MILL.

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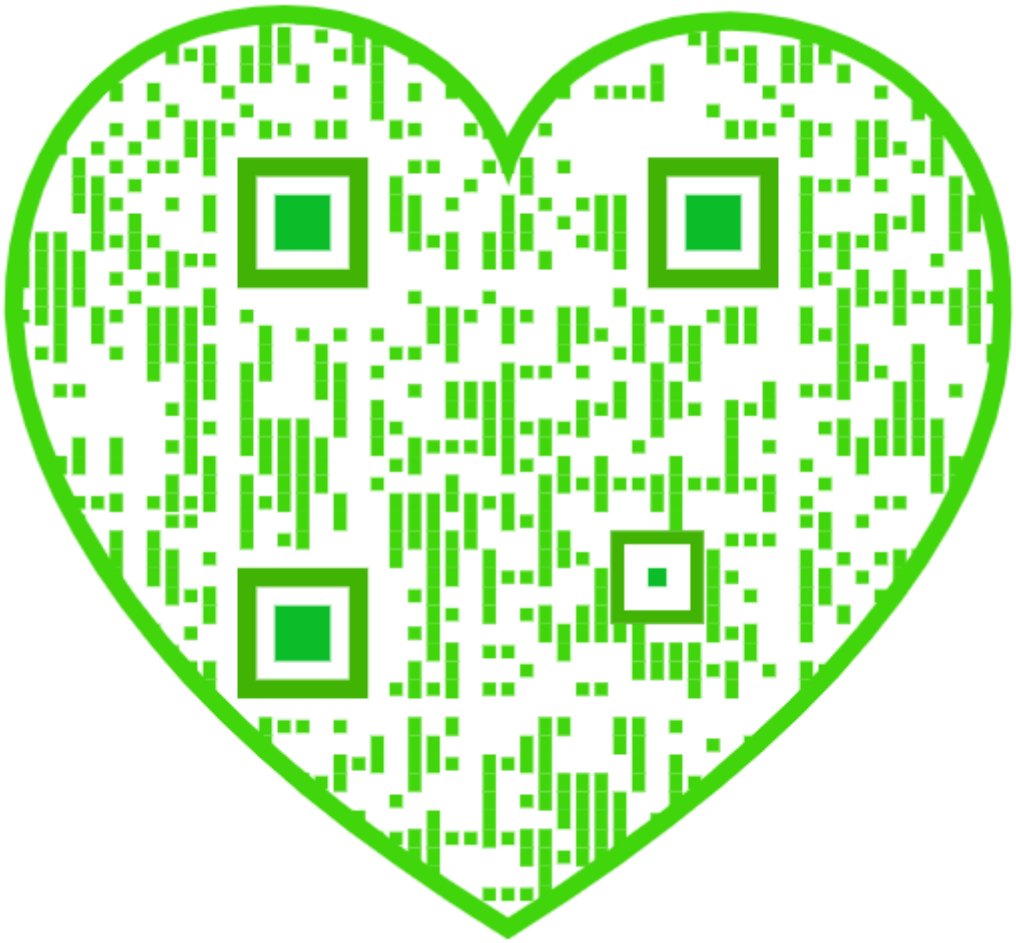

Philosophy of Exercise.

All know that the less we exercise the less health we have, and the more certain are we to die before our time. But comparatively few persons are able to explain how exercise does promote health. Both beast and bird, in a state of nature, are exempt from disease, except in rare cases; it is because the unappeasable instinct of searching for their necessary food, impels them to ceaseless activities. Children, when left to themselves, eat a great deal and have excellent health, because they will be doing something all the time, until they become so tired they fall asleep; and as soon as they wake, they begin right away to run about again; thus their whole existence is spent in alternate eating and sleeping, and exercise, which is interesting and pleasurable. The health of childhood would be enjoyed by those of maturer years, if, like children, they would eat only when they are hungry, stop when they have done, take rest in sleep as soon as they are tired, and when not eating or resting, would spend the time diligently in such muscular activities as would be interesting, agreeable, and profitable. Exercise without mental elasticity, without an enlivenment of the feelings and the mind, is of comparatively little value.

1. Exercise is health-producing, because it works off and out of the system its waste, dead, and effete matters; these are all converted into a liquid form, called by some "humors," which have exit from the body through the "pores" of the skin, in the shape of perspiration, which all have seen, and which all know is the result of exercise, when the body is in a state of health. Thus it is, that persons who do not perspire, who have a dry skin, are always either feverish or chilly, and are never well, and never can be as long as that condition exists. So exercise, by working out of the system its waste, decayed, and useless matters, keeps the human machine "free;" otherwise it would soon clog up, and the wheels of life would stop forever!

2. Exercise improves the health, because every step a man takes tends to impart motion to the bowels; a proper amount of exercise keeps them acting once in every twenty-four hours; if they have not motion enough, there is constipation, which brings on very many fatal diseases; hence exercise, especially that of walking, wards off innumerable diseases, when it is kept up to an extent equal to inducing one action of the bowels daily.

3. Exercise is healthful, because the more we exercise the faster we breathe. If we breathe faster, we take that much more air into the lungs; but it is the air we breathe which purifies the blood, and the more air we take in, the more perfectly is that process performed; the purer the blood is, as everybody knows, the better the health must be. Hence, when a person's lungs are impaired, he does not take in enough air for the wants of the system; that being the case, the air he does breathe should be the purest possible, which is out-door air. Hence, the more a consumptive stays in the house, the more certain and more speedy is his death.—*Hall's Journal of Health.*

Hunting for Cedar Timber.

In New Jersey there are men who make it a business to dig up the cedar trees buried for centuries in the swamps, and cut them into shingles of, it is said, extraordinary excellence. A correspondent of the New York *Post* thus describes the timber, and the process of "getting it out":—

"These swamps are very valuable, an acre of such timber commanding from five hundred to a thousand dollars. A peculiar feature of the swamps is that the soil is of purely vegetable growth, often twenty feet or more in depth. This peaty earth is constantly accumulating, from the fall of leaves and boughs, and trees are found buried in it at all depths, quite down to solid ground. The timber so buried retains its buoyancy and color, and it is considered so valuable, that large numbers of workmen are constantly employed in raising and splitting the logs into rails and shingles. In searching for these logs the workman uses an iron rod, which he thrusts into the soil, and by repeated trials ascertains the size and length of the wood he strikes, and then by digging down obtains a chip, by the smell of which he can determine whether it is worth removal. The number of shingles produced from the wood of these submerged forests is very great; from the little town of Dennisville, in this county, as many as eight hundred thousand, valued at twelve thousand dollars, have been sent to market in a year. From the same place thousands of dollars' worth of white cedar rails are annually sent out. The deposit of timber at this point extends to an indefinite depth, and although, from the growth above it, believed to be two thousand years old, is all entirely sound, and will supply, for years to come, the draft upon it."

The Monitors at Sea.

The following incidents are collated from a letter written on board the *Lehigh* to the New York *Times*:—

"On Wednesday night, the 26th, after a cloudy afternoon, the wind from the northeast began to blow hard about 7 P. M., with a sea rapidly rising. The storm increased hourly until 11 P. M., the wind blowing a perfect gale, changing from northeast to southeast, then to west-northwest.

"During this time the *Lehigh* had been straining and bumping her overhang upon the seas at a fearful rate, making sleep impossible. So rapid was the motion, so heavy and continuous the shocks of the projecting snout and overhang, that all became alarmed for the safety of the ship. The solid shot beneath her berth deck were rolling about adrift, efforts to check them being of no avail. Officers and men thronged the upper turret-deck; anxious glances were cast upon the rubber-raft, which was inflated in readiness for use; life-preservers and bread and water were sought for, and the fate of the gallant crew of the first *Monitor* canvassed.

"About this time a heavy sea, which covered the deck from the bow to the turret with a solid mass of water, lifted our ship's bell bodily out of its socket, some six inches deep, and bore it off like a chip overboard. The bell and fittings must have weighed about three hundred pounds, and were fastened to the turret, seven feet above the deck.

"The waves were sharp-topped combers, and repeatedly broke over the top of the elevator, twelve feet high. They broke over the turret-top, flooding the engine-room beneath.

"Several times a large wave would roll over the deck, strike against the front of the massive turret, with furious shock, its top striking officers in the back, and sweeping them across the turret deck to its other side.

"We were now heading the sea, our officers on the front part of the turret deck holding on to stanchions to prevent being washed overboard, the men occupying the after part. Our good ship would seemingly crawl up the face of a big sea, like a cat crawling (the sensation of crawling or creeping upward was prominent) up the steep roof of a house to the ridge-pole, and reaching its summit, look below, and hesitate whether to descend on the other side or fall back, and descending would appear to be diving to the bottom. With bated breath we waited, saw the ship's iron snout thrust into the second wave, take on deck much water, but yet rise up as before, and again descending, take the greater part of the third and greatest wave upon its deck, not being able to rise quick enough to surmount it: and thus at every moment gaining greater confidence in our noble, though heavy and uncouth, iron-clad vessel; though still fearing that some of the powerful seas, as we fell upon them, would force up our overhang, and once starting it, sweep in a moment our whole iron deck from the hull.

"While this scene was passing above, the beak below was more provoking; all night long, innumerable little streams of sea water, yellow with iron rust, poured down upon everything in cabin, wardroom, dispensary and birthdeck, wetting beds and bedding, wardrobes, mess stores, tools, &c. Numerous were the contrivances to meet and accord a reception to the unwelcome visitor, in the shape of paymasters' mess pans, doctors' sponges, and empty meat cans, fastened up to catch the water. Vain was the effort to sit in some spot in the officers' wardroom where the water did not drip a constant shower upon you.

"The gale, the high sea, and the night, passed away together. Not so our leaking deck, however; and, to add to our comfort, the necessity of having hatches and deck-lights down and shut, causing a resort to candlelights, daylight being of course excluded, and the heated, foul air (ventilation being very imperfect when the hatches are down) causing headache, and a feeling of faintness, loss of appetite, &c.

"The temperature on the berth deck at the wardroom door ranges between 95° and 101° day after day."

The Oil Wells.

During the past year a number of the most valuable wells in the oil region have either ceased flowing altogether, or produce so little of the oleaginous fluid now as to yield but small profits to their owners. This singular change is accounted for on the ground that, owing to the manner in which the oil-producing district has been honey-combed, as it were, with wells, the gas, which forces the oil to the surface, finding a free vent, has, in most cases, lost its strength, and escapes without forcing the oil up as before. Besides this, countless water-courses have been let down into the oil beds, effectually stopping or drowning them out. The Oil City *Regieter* says:—"We have no remarkable change to note in the oil market during the past and present week. Crude has ruled steady, and closes with a slight improvement in the views of producers. The season for the fall business to commence is close at hand. We give as the ruling quotation for the week $6 00 to $6 50 at the wells. We have heard of one sale at the Tarr Farm at $7 00. Producers are now asking $6 50 to $7 00 per barrel, according to locality. Boatmen are asking $1 50 to $1 65 per barrel freight to Pittsburgh."

The oil region presents many of the peculiar characteristics of a productive gold locality. New houses spring up in a day. The population increases rapidly. Villages have grown into towns. Money is abundant and is lavishly spent. Titusville, the principal town in the valley, has increased its population from 400 to 2,501. It has its newspaper, numerous stores and workshops, a bank, with a capital of $500,000, and all the other adjuncts of a thriving business. Corry is quite a village at the junction of the Oil Creek and Great Western Railroad, the site of which was last year a wilderness. Oil City has also been built up to the proportions of a town by the oil business, and Franklin has largely increased in population.

Tunnel Through the Alps.

The greatest single engineering work ever undertaken is the tunnel for a railroad through Mont Cenis. A report on this subject has lately been presented to the Lower House of the Italian Parliament by the Minister of Public Works. This tunnel was begun in 1857, and that year and the two following were spent in preliminary operations, such as the construction of houses, workshops, &c. When completed it will be nearly 8 miles in length. Mr. Bartlett, an English engineer, set in operation a steam boring machine, soon after operations were commenced, and about eight times the quantity of work was done by it that had been done by hand. But steam could not be used for boring in the interior of the tunnel, on account of a want of air. The Italian engineers then proposed to substitute compressed air instead of steam; and their method is now in full operation.

This tunnel, when completed, will unite France with Italy, by rail, and it is to be a joint work between the Governments of the two countries, France paying a large portion of the cost. It is calculated that this tunnel will be completed in twelve and a half years from the period of its commencement; but with ordinary hand drilling it would have required twenty-five years' labor. The work proceeds now at the rate of 2,600 feet per annum. The use of compressed air to operate the drilling machines, not only affords the power for this purpose, but also supplies air for respiration to the miners. At one end, 720 men are employed; at the other, 900. The cost thus far has been about $2,545,400.

In publishing a Cambridge edition of Shakespeare, McMillan & Co., of London, acknowledge their indebtedness to John Bullock, brass finisher, of Aberdeen, for valuable notes. He is said to be one of the best students of English literature in the kingdom.

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NEW BOOKS AND PUBLICATIONS.

CLASS BOOK OF CHEMISTRY; by Edward L. Youman's, M. D. Published by D. Appleton & Co., Broadway New York.

Dr. Youmans possesses the faculty of teaching chemistry in a clear and attractive manner. His "Class Book of Chemistry" was published ten years ago, but such has been the rapid strides made in chemical science recently, that it has been re-written, re-illustrated, much enlarged, and the new facts and principles bearing upon chemistry embodied in it. The old notion that the forces of nature are separate and peculiar forms of imponderable matter, has given way to the idea that they are closely allied and mutually convertible forms of activity or motion in ordinary matter. Professor Tyndall's volume on "Heat Considered as a Mode of Motion," noticed on page 146, current volume of the SCIENTIFIC AMERICAN, has dispelled the darkness which formerly enshrouded this subject, and the new views are illustrated and described in this volume. Spectrum analysis is also illustrated and described. This is another important discovery made since the "Class Book" was formermerly published; and by this mode of investigation several new metals have been discovered, and the chemical composition of the sun himself has been ascertained. Dialysis—the important discovery of Professor Graham, made only a few years since—is also clearly explained; also the remarkable researches of Bertholet in synthetical chemistry, whereby the artificial production of organic substances has been achieved. Various other particulars of recent scientific progress, which have not yet found their way into text books of chemistry, are embodied in this, which is designed as an elementary manual for students, and a school text book; for which it is conveniently adapted, as it informs students how to make experiments themselves, and thus put in practice what they are taught. The following interesting extracts are condensed from it respecting organic synthesis:—

"An unexpected and remarkable advancement of organic synthesis has recently been made by Bertholet, of France. This chemist has devoted himself to the formation of organic substances, synthetically, by combining their elements through the aid of chemical forces only. He says:—'We have taken for a point of departure the simple bodies—carbon, oxygen, hydrogen and nitrogen, and have constructed, by combination of these elements, organic compounds, identical with the principles contained in living bodies. The substances that we first prepare by methods purely chemical on the principal carbides of hydrogen—the fundamental binary compounds of organic chemistry.' With oxide of carbon—a substance purely mineral—formic acid is produced, (the first organic compound) by the aid of pressure and in the presence of an alkali. This acid united to a mineral base produces a formate, which being decomposed by heat, the carbon and the hydrogen of water combine in a nascent state and produce carbides of hydrogen. From this marsh gas, olefiant gas and propylene, are produced, being the first step in synthesis. With marsh gas and oxygen, methylic alcohol is formed; and with olefiant gas and water, common alcohol is formed. Bertholet has converted propylene into glycerine—a proximate principle of fats; and glycerine has been transformed into one variety of sugar. What organic synthesis may yet achieve, it would be vain tospeculate upon; but it is not among impossibilities that our sugar may yet be manufactured from coal."

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston, Mass.

The October number of this invaluable periodical is unusually interesting, and that is saying a great deal. The leading article is a continuation of Charles Lamb's uncollected writings, and deals tenderly with the great essayist's memory and genius. "My Palace," a lengthy poem, is rather mystified, and belongs to the "Light and Dark" school of poetry. The "Deacon's Holocaust" a tale is apparently one of a series in which the same characters appear in different scenes; the writer has a genial and sometimes stinging humor which he displays to much advantage, and the pictures of rural domestic life are faithful and pleasing. The "United States Armory" rather surprised us, for we failed to glean anything new or of interest from it, except that which is already widely known to all well-informed persons. "A Letter to Thomas Carlyle," handles that satirist without gloves, if we may be allowed the phrase; but we do not imagine that he will be affected to tears by it. A man so far lost to courtesy and humanity as to insult a nation struggling for its existence by his "Iliad" will hardly be pierced in his thick moral cuticle by an essay in the shape of a letter, be it ever so well written and conceived. "Life without Principle," is a most excellent article, and one that men would do well to heed; we will thank the author, however, to be more circumspect in future, and consult us before publishing, as he has touched on a favorite hobby of our own. The poetry in this number is of unusual excellence.

Mechanical and other Items of the War

THE "HOME."—It will be remembered that the Navy Department, with a thoughtfulness that was highly creditable to it, fitted out a small steamer called the *Home*, which was to be such in reality to the tired and over-worked officers on the iron-clads before Charleston. The steamer duly arrived at her destination, but she was found entirely unfit for the service proposed, and the excellent intention of the Navy Department was by no means carried out. She was immediately surveyed, condemned *in toto*, and sent to Port Royal, where she now lies for repairs sufficient to enable her to return to New York. It was a sore disappointment to the worn-out occupants of the damp, dark quarters of the monitors, but they preferred to remain where they were than go on board of her. She had no accommodation for officers, beyond her own complement, and "guests" on board the *Home* would have had to patronize the floor of the ward room, if they were sufficiently attracted by her name to remain on board over night. The same was the case with the men—her own crew needed all the space on her berth decks. But worst of all, she was without any proper outfit wherewith to entertain and comfort the men, who are so cheerfully enduring every discomfort and trial incident to monitors, and constantly exposed to the ocean swell, which keeps our decks wet all the time, and dismantled to "battle trim" week after week.

Somebody is to blame—who is it?

GOVERNMENT ARMS AND ORDNANCE.—In Providence, R. I., there are fifteen hundred and thirty-five persons employed on Government work. One establishment alone employs five hundred workmen on the Springfield rifled musket, and other factories are working with smaller forces on particular parts of the same favorite arm. An iron foundery employing one hundred hands is now casting ordnance comprising 11 and 13-inch Dahlgren guns, with shot and shell for the same. A gun is turned off once in four days, and five tuns of shot and shell are cast per day. The wrought-iron Ericsson gun for the monster iron-clad *Dictator*, now building at New York, is to be bored and fitted for completion at this place. After it is bored it is to be brought to New York and completed, under the superintendence of Captain Ericsson, by putting on bands six inches in thickness.

The celebrated *Sumter*, alias *Gibraltar*, ran the blockade of Charleston on the morning of the 22d ult. She had on board two 600-pounders, and four 200-pounders.

[The "celebrated *Sumter*" was unfortunately sunk by Fort Moultrie (it is supposed) before she reached the city. About twenty persons were drowned out of a large number on board at the time.—EDS.

Captain Ericsson has contracted to construct some 13-inch smooth-bore guns, which are to have a much greater initial velocity than any now in use. He is to receive nothing for these guns unless they burn over 50 pounds of powder—for every pound of powder beyond 50, Mr. Ericsson is to receive $5,000. He is confident of being able to burn 100 pounds, and is certain of burning 75 pounds. The solid shot will weigh 220 pounds.

The new gunboat *Ozark* had a trial trip on the Mississippi, on Sept. 18. The naval inspectors pronounced the performance satisfactory. She is armed with two 11-inch guns in a revolving turret.

A large 15-inch gun was recently sent out to New Orleans on the steamship *McClellan*. The weight of the gun is very nearly 19 tuns.

MISCELLANEOUS SUMMARY.

EXPLODING GUN COTTON ACCIDENTALLY.—The following is the opinion of Dr. Phipson, given in a recent number of the *Moniteur de la Photographie*, Paris:—"It may perhaps be remembered that Mr. Dornbach, a young artist photographer, of America, met his death by the explosion of some gun-cotton he was packing in a cask, making use of a stick to force it down. It is questioned whether the explosion was caused by electricity or by friction; but the high temperature required to inflame gun-cotton may lead us to doubt whether the friction of the stick against the sides of the cask would evolve sufficient heat, although we cannot undertake to say it would be impossible. Dry gun-cotton is a highly electrical substance, developing a great quantity of resinous electricity by friction, and it is highly probable that in the operation which cost Mr. Dornbach his life an electrical spark inflamed the mass."

ACTING ENGINEERS IN THE NAVY.—A recent order says:—"The attention of the Department has been called to 'the almost universal complaint of defects in machinery and boilers of vessels' returning from cruises, and to the 'negligence on the part of engineers in not repairing the defects as they occur, but waiting until they arrive in port, when everything is to be done by mechanics from the Navy Yards.'"

"Engineers will hereafter understand that the condition of the machinery under their charge, on the arrival of the vessel from a cruise, will be considered as a test of their efficiency and fidelity in the discharge of their duties; and that the result of the examination then made, will determine whether they have discharged their duties in such a manner as to deserve commendation, or have been so grossly negligent or incompetent as to render their expulsion from the service an act of justice to the public."

GIDEON WELLES, Secretary of the Navy.

CHICAGO WOOD PAVEMENTS.—The Board of Works in the city of Chicago have given the preference to wood pavements over those of stone, as being the most durable of any kind yet used there. The following is a description of the method of construction:—Lay down flooring of 1-inch board on a bed of sand; coat the floor with asphaltum; stand on end blocks of wood 6 inches high, by 3 inches thick and 9 inches in length, in rows about 1 inch apart, divided by strips of board. Fill in these open narrow spaces with asphaltum and pebbles, and then cover the whole with asphaltum. There are six miles of these pavements in Chicago, which after six years constant wear, are found to be nearly as perfect as when laid down.

PORT ROYAL MECHANICS.—A writer in "Harper's Magazine" says of the mechanics employed by Government at Port Royal, that they are the slowest and the laziest set he ever saw. He says they come to work at nine in the morning, and go home at three in the afternoon, taking the usual hour for dinner *ad interim*. For this exhausting labor they receive $3 per day and rations; one of them was detected asleep at 10 o'clock A. M. This, if true, is *rather* a damaging record, and if the acting engineers depend on these gentry to overhaul their machinery, they will be slightly delayed.

THE REBEL RAMS.—From the tenor of recent dispatches there is but little question that the rams building in England for the rebels will soon leave for this country. They are preparing for a trial trip, and as the builders say that they have received no official intimation from Earl Russell that they are to be detained, it is not at all doubtful what course will be pursued. A large number of sailors from the *Florida*, now lying at a French port, have arrived in Liverpool to man the ram nearly ready for sea.

A REBEL "gunboat" (without any guns) was recently captured by the *Jessup* in the Pamunkey river. This craft was a common row boat 40 feet long, and had a small engine of about one calf power in the stern. She was used for towing vessels loaded with grain, and it is said made very good time.

The *Galena* has been converted from an iron-clad to a gunboat. She has been placed on the dry docks in the Philadelphia Navy Yard to have her hull overhauled and coppered.

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A NOVEL MODE OF TELEGRAPHING BY SOLAR LIGHT.

A simple and we believe a new method of telegraphing by signals, has just been brought to our notice by Messrs. Abner Lane and Sherman Kelsey, of Killingworth, Conn. These gentlemen have recently instituted a series of experiments to ascertain the possibility of communicating intelligibly between remote points. Having become satisfied of the practicability of their scheme, they have filed a caveat in the United States Patent Office, and secured this discovery to themselves. The principle of this telegraph is that of reflected light. A common looking-glass of any suitable size (the power of course varying with the dimensions) is so held in the sunlight as to project a pencil of rays in the direction of the person to be communicated with. When the beam of light passes the eyes of the second party, it is readily distinguished, and the message is sent by intermitting the time between the flashes. Thus, if one movement of the mirror is made, that will denote A; two movements, B; and so on through the alphabet. In transmitting sentences or lengthened conversations, it is necessary, of course, to begin indiscriminately in the alphabet, commencing to spell a word. Thus, if the word Light is to be sent, the glass is moved for a b c d e f g h i j k *l*. Then a longer interval; then moved for a b c d e f g h *i;* when another interval occurs, and the glass is again moved for a b c d e f *g*—interval—then for a b c d e f g *h*—interval—then for a b c d e f g h i j k l m n o p q r s *t*—then cease. Operator No. 2 repeats as he sees the flashes, a b c d e f g h i j k *l*. He knows *l* is the first letter; then repeats a b c d e f g h *i*—*i*, then, is the next letter. Then a b c d e f *g*—then *g* is the next. Then a b c d e f g *h*—*h* the next. Then a b c d e f g h i j k l m n o p q r s *t*—*t* the next. He then has the word Light.

From the above it can be seen how any message can be sent, or how any conversation can be carried on. For operator No. 2 can have a mirror and send back messages or answers in the same way. An experimental trial of this system of telegraphy was made by the parties interested a short time ago. The scene of the experiment was between Falkland Island and the mainland, (Connecticut) a distance of 15 miles intervening between the operators. It was satisfactorily ascertained that simple sentences could be transmitted with the greatest ease, and the inventors conversed for an hour and a-half on topics concerning family matters. The principle can be applied in many ways. The flashes can be repeated an unequal number of times, and at different intervals, to represent certain letters and sounds. Also two or more flashes may be repeated, in quick succession with a single flash, at different intervals and in different orders, to represent letters or sounds. Instead of moving the mirror, it may be stationary, except to move as the sun moves, so as to throw light in the right direction. The rays may be also intercepted periodically by a screen or other device. The light may be continued for any length of time, either in a single flash or as long as desired.

An alphabet of the character of the "Morse alphabet" may also be used. Mr. Lane states that he has devised an alphabet by which messages can be conveyed, with the same facility and dispatch as by the electro-magnetic telegraph with the "Morse" alphabet. So also colored light may be used in connection with this system of telegraphy.

The means by which the ends are attained are simple, and require no apparatus beyond an ordinary mirror. For army and navy purposes we should think this mode of telegraphing is peculiarly adapted.

THE AMERICAN WATCH AS A TIME-KEEPER.

Some time during the early part of this year we visited Waltham, Mass.; in a subsequent number of the Scientific American we gave an account of the American Watch Factory at that place, and the operations therein carried on. We also expressed the opinion that for beauty of workmanship, exactness as time-keepers, and general reliability, the watches there made were not surpassed, or even equalled, by any imported. Wholly from a desire to see the American watch in the pockets of the American people, and Yankee time recorded by the product of Yankee skill, we reassert the opinions then expressed: they are fully sustained by our experience, and we are satisfied that no one need desire a more accurate or beautiful watch than those made at Waltham; all the encomiums we pronounced on the occasion referred to are fully warranted. There is an American watch in this office, of the very finest quality, which has not lost 90 seconds in 8 months; there may be some even better records than this; but although we pride ourselves on our punctuality, it is near enough for our purposes, and if we lose no more than one minute and a-half from our engagements in half a year, we are well content to set it down as profit and loss. These remarks are unsolicited from any source, but are only an act of simple justice to the American Watch Company.

HORACE H. DAY'S INDIA-RUBBER BREECH-PIECE.

Report made to Bureau of Ordnance (Navy Department) on September 23, 1863, by Lieutenant-Commander W. W. Queen, on Gun-practice with Day's India-Rubber Breech-Piece.

Gun Practice at Experimental Battery, Dec. 20th, 1862.

Gun, 32-pdr., No. 354 (W. P. F.), on wood carriage in battery, with India-rubber Breech-piece. Projectiles, 32-pdr. shot. Charges of cannon powder, 1862. Fired with slow match. Officer in charge, Lieutenant-Commander Queen. Gunner, Mr. Moore. Plane table, William P. Wright. Quadrant, N. Binnin. Elevated 2° 23′ by quadrant. Aimed in line with middle screen pole. Wind N. N. W. Force, 6. Ebb tide, 6.6 to 7.5.

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insertion.	Recoil.	Time of Flight.	Height.	Range.	Remarks.
		lbs.	lbs.	in.	ft.	sec.		yds.	
9	1	32.75	84¾	10.	3.8	4	4	1135	In line with left hand pole. Richt. to left.
"	2	32.25	"	10.	4.	1	"	1231	" " "
"	3	"	Aimed at	10.	3.6	1	1½	1211	" and pole.
"	4	32.75	"	11.	3.6	3	2	1224	To line with middle pole. Richt. to left.
"	5	32.50	"	10.	3.6	3	3	1194	To the right of middle pole. Richt. to right.
"	6	32.25	Aimed in	10.	3.6	1	middle	1224	Slightly to the left of middle pole.
"	7	31.75	"	9.	10.4	1	with m	1227	In line with left hand pole. Richt. to left.
"	8	"	"	10.	3.6	8	4	1136	Line shot. Richt. to right.
30	9	32.25	"	10.	3.8	10	5	1140	Slightly to left of 2d hand pole. Richt. to left.
"	10	32.25	"	10.	3.8	7	6	1256	Slightly to right of middle pole. Richt. to right.
"	11	32.75	"	10.	8.4	9	7	1334	Line shot. Richt. in line.

Had to draw the 8th charge and put in a new match, the shot having laid on the 1st match, putting it out. A primer was used previous to withdrawing the charge, which had no effect except to make a hole in the rubber.

Several times the rubber breech-piece was forced out of the chamber by the concussion.

The record shows that not much accuracy was obtained, although the gun was well sighted.

No tackles or breechings used.

With India-Rubber Breech-Piece, December 20th, 1862.

32-pdr., No. 354, (W. P. F.) Shot, 32.50 lbs. 9 lbs. cannon powder, 1862.

No.	Range.	Diff.
7	1136	
		4
8	1140	
		45
1	1185	
		9
4	1194	
		30
3	1224	
		3
6	1227	
		7
5	1234	
		9
2	1243	
		13
9	1256	
		78
10	1334	
	1217.3	198

Fired for comparison with India-Rubber Breech-Piece, Dec. 20th, 1862.

32-pdr., No. 354, (W. P. F.) Shot 32.50 lbs. 9 lbs. cannon powder 1862. Elevation, 2° 33′.

No.	Range.	Diff.
18	1118	
		62
16	1180	
		46
14	1226	
		53
11	1279	
		17
12	1296	
		3
13	1299	
		19
19	1318	
		37
15	1355	
		24
17	1379	
		29
20	1408	
	1285.8	290

Respectfully submitted,
(Signed) W. W. Queen,
Lieut.-Comdr. U. S. N.

Correct copy.
W. Mitchell,
Lieut.-Comdr. and Executive Officer.
September 23, 1863.

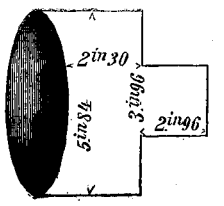
Gun Practice at Eastern Branch Battery, January 15th, 1863.

Gun, 130-pdr., No. 1 (F. P. F.), mounted on pivot carriage, in barricade, with India-rubber Breech-piece. Charges, 40 lbs. cannon powder 1862. Projectiles, solid shot. Fired from muzzle with quick match. Officer in charge, Lieut.-Comdr. J. G. Mitchell. Record by Cook. Aimed at bank of earth at eighty-five feet.

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insertion.	Recoil.	Distance to Bank.	Penetration in Bank.	Remarks.
		lbs.	lbs.	in.		ft.	feet.	
29	1	40	126	64	Taut Breeching	85	16	Rubber breech-piece was blown out and struck the bank.
30	2	40	126	64	7.0	55	16½	Rubber breech-piece started forward 50½ inches.
31	3	40	126	64	7.0	35	16	While sponging the gun out several small pieces of rubber were found. On examining the breech found it badly torn.
32	4	40	126	64	7.0	55	17	The rubber breech-piece was blown out, and fell 50 feet to the front of muzzle of gun.
								Finding it so badly damaged, the trial was discontinued.

The rubber breech-piece was 8 inches in length and .2 of an inch smaller in diameter than the bore of the gun, with its rear shaped to fit the bottom of the bore.

The rear of the breech-piece was hollowed out, as per sketch.



The rubber was vulcanized to 280° Fah.
Weight of breech-piece, 22 lbs.

Respectfully submitted,
(Signed) John J. Mitchell,
Lieut.-Comdr. U. S. N.

Correct copy.
W. Mitchell,
Lieut.-Comdr. and Executive Officer.
September 23, 1863.

Practice at Iron-Plated Target, No. 35, Experimental Battery, March 2, 1863.

Gun, 130 pdr., No. 2. On pivot carriage at east end of battery. Charges, cannon powder. Projectiles, solid shot, Cloverdale cast-iron. Primers, quick match from muzzle. Officer in charge, Lieut.-Comdr. Wm. Mitchell. Record by Moore.

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insert'n.	Recoil.	Time Fired.	Center of Trun's above water.	Remarks.
		lbs.	lbs.	in.	ft.	P. M. h. m.	ft.	
	1	43	130.50	73¼	8.4	12.20	101.4	

Mr. Day's India-Rubber Breech-piece was used. The following are the measurements and weight: Length, 10 inches; diameter, 9.95 inches; weight, 34 lbs. 2½.

The Rubber Breech-piece was thrown forward from its seat 2½ inches, and the action of the gas escaping through the vent drew the surface of the rear of breech-piece toward the vent, making a ragged mass of rubber at that point, and stopping up the vent.

Respectfully submitted,
(Signed) Wm. Mitchell,
Lieut.-Comdr. U. S. N.

Correct.
W. Mitchell,
Lieut.-Comdr. and Executive Officer.
September 23, 1863.

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PRACTICE AT TARGET MADE OF HOGS-HAIR.

REPORT MADE TO BUREAU OF ORDNANCE (NAVY DEPARTMENT) ON SEPTEMBER 1ST, 1863, BY LIEUT.-COMMANDER WILLIAM MITCHELL, ON AN EXPERIMENTAL TRIAL OF THE RESISTING QUALITIES OF A HOGS-HAIR TARGET, THE INVENTION OF MR. —— BRADY.

Practice at Target No. 44, *made of Hogs-hair, on the Plan of Mr. Brady, Pencote Battery, Sept.* 1, 1863.

This Target was made of 5 bales of hogs-hair, faced and backed with pine plank 4 inches thick, and fastened with 28 wrought-iron bolts.

Two of the bales had been subjected to one and the same amount of compression, and two others were compressed alike but differing in degree from the former, and the remaining bale, as stated by the inventor, was but slightly compressed. The bales were bound with iron hoops.

The target was backed with 4 feet of solid clay.

Dimensions of Target.—Eleven feet three inches long; four feet wide; three feet three and a half inches thick.

Gun Practice at Experimental Battery, Sept. 1, 1863.

Gun, Rifle, 50-pdr., No. 30, mounted on wooden carriage on Pencote Battery. Charges, 3¼ lbs. Schagticoke cannon powder. Projectile, J. A. D. Shell. Primers, friction. Officer in charge, Lieut.-Comdr. Wm. Mitchell. Record by Bangs. Aimed at Target.

No. from Gun.	No. to-day.	Charge.	Weight of Projectile.	Insert'n.	Recoil.	Time when Fired.	REMARKS.
		lbs.	lbs.	in.	ft.	a. m. h. m.	
	1	3¼	38.	70	2.9	10.25	
	2	"	36.25	"	3.	10.37	
	3	"	"	"	2.7	10.49	
	4	"	37.	"	3.	10.58	

1*st Shot* struck the right hand bale in the center, passing entirely through bale and 4 feet of clay, entering the bank at a distance of 18 feet 3 inches back of target, and imbedding itself.

2*d Shot* struck the 2d bale from right edge of target in the center, passing entirely through bale and 4 feet of clay, entering the bank at a distance of 10 feet back of target, and imbedding itself.

3*d Shot* struck 3d bale from right edge of target in the center, passing entirely through bale and 4 feet of clay, entering the bank at a distance of 12 feet back of target, and imbedding itself.

4*th Shot* struck 2d bale from left edge in the center, passing entirely through bale and 4 feet of clay, entering the bank at a distance of 11 feet back of target, imbedding itself.

The 5th bale was not fired at, at the request of the inventor. It will be perceived that all the bales were pierced, and the projectiles not having been found, it was not possible to ascertain which offered the greatest resistance.

Respectfully submitted,

W. MITCHELL,

Lieut.-Comdr. U. S. N. and Executive Officer.

The Atlantic and Great Western Railway.

This is a line of the broad gage, which taps the New York and Erie at Salamanca, and is intended to run to Alton, Illinois; forming a continuous broad-gage line from the Hudson to the Mississippi River. On the unfinished portion of the main line west of Akron, Ohio, upwards of five thousand laborers are constantly at work, and of the 30,000 tuns of rails required for its completion more than 20,000 tuns have already arrived. Between Salamanca and Akron, and along the tributary branches from the oil regions at Titusville and Franklin, the line is in fine working order. Upwards of one hundred additional engines are in course of construction at the best engineering establishments in the country, with a corresponding number of cars, to be ready for the through traffic which will follow its connection with the Ohio and Mississippi Railroad in November next. The central depot is at Meadville, in Pennsylvania, where the company's workshops and the houses of the employees are situated, covering an area of sixty acres.

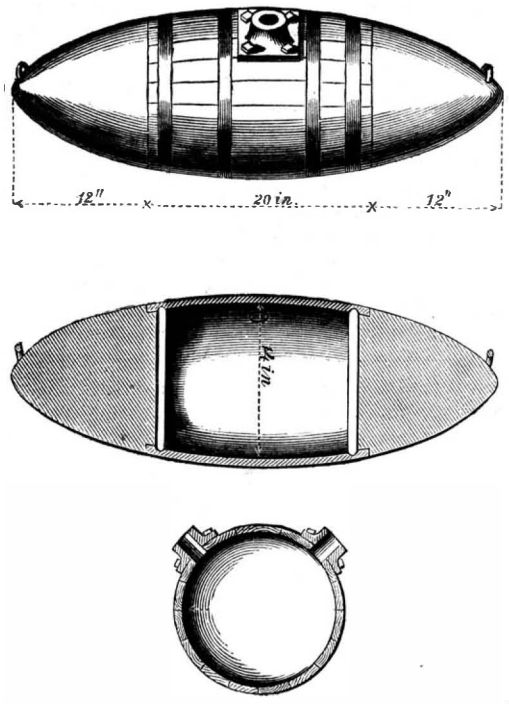
The Boston people intend to construct a line to connect with the New York and Erie, at Newburg, N. Y., and thus form a continuous line from Boston to the Mississippi. The Boston line is to run to Fishkill, opposite Newburgh.

EXAMINATION OF TORPEDO SENT FROM THE NAVY DEPARTMENT.

NAVY ORDNANCE YARD,
Washington City, Sept. 5, 1863.

Lieutenant Commander Wm. Mitchell, Executive Officer:

SIR:—I have the honor to report that I have examined the Torpedo sent to this Yard from the Navy Department, of which the following is a description:



It is three feet eight inches (3 feet 8 inches) in length, by one foot two inches (1 foot 2 inches) in width, elliptical in shape, and resembles very closely in its general appearance an ordinary Nun Buoy. It seems to have been constructed of a small keg, the staves of which are oak with two solid cones of pine driven on to the heads and secured by hoops, the heads being well pitched. On its sides secured by screw bolts, are two metal tubes which probably contained the fuse and apparatus for igniting it, but these had been removed before its arrival here. The cavity is of sufficient capacity to hold about sixty-five pounds of powder. Annexed is a sketch of the Torpedo. Very respectfully,

Your obedient servant,

M. P. JONES,

Lieutenant Commander U. S. N.

Respectfully forwarded.

W. MITCHELL,

Executive Officer Ordnance Yard.

BIRNEY'S INCENDIARY SHELL.

EXTRACT FROM REPORT TO BUREAU OF NAVY ORDNANCE IN REFERENCE TO BIRNEY'S INCENDIARY SHELLS, DATED

FLAG-STEAMER PHILADELPHIA,
Off Morris Island, Sept. 19, 1863.

* * * * * * * * * * *

"Yesterday, in a conversation with Major-General Gillmore, he stated that the incendiary shells used by him burst, without exception, before reaching the distance of one mile; and that, in trying the composition on his tent floor, the burning of it was quite harmless."

ENGLISH AND AMERICAN IRON-CLAD SHIPS OF WAR.

If our people are in any doubt as to the utility of the monitor batteries and their value as impregnable vessels of war, our ostensible friend, the English Government, seems to be fully aware of their value; they are quite astonished at the qualities recently developed by the craft in question. The united leading press of England concur in attributing great impregnability and offensive power to these ships, and express some doubts (in view of the destruction of the rebel pirate *Atlanta*, in Warsaw Sound by the monitor *Weehawken*) whether their own vessels, built on similar principles, are fit to be pitted against ours. The English *Royal Sovereign* is a turret ship; differing materially from our vessels of that class, as will be seen by referring to the subjoined description cut from the London *Times*, and comparing the same with the essential features (now so well known), of the Ericcson batteries.

"To return to our own *Royal Sovereign*. It is necessary to repeat here that she is being fitted with four turrets, the one forward being the largest of the four, and intended to carry two three-hundred-pounder smooth-bore guns, while the three others will be of less diameter, and will carry only one gun each of the same calibre. From the inner skin of the turret, formed of half-inch boiler plate, will project outward iron ribs T-shaped, ten inches in length and twenty inches apart, the spaces between these ribs being filled in solid with teak. Round the outer circumference of this combination of teak and iron ribs is a crossed trelliswork of three-quarters of an inch of iron, and on this trellis work, and through all and outside all is bolted eight inches of solid teak. Here is a structure at once far better calculated to resist the impact of shot than the turrets of the *Keokuk* could have been, although the turret of the *Royal Sovereign* which has been so far described is as yet without its armor; for round the outer surface of the turret on the eight-inch teak cushioning, are to be laid the solid five and a half inch rolled armor plates, which are now being manufactured, and bent immediately on leaving the rolls to the required segments of a circle, at the Parkgate Works, Yorkshire. In the immediate front of the turret or vicinity of the two ports, however, the resisting power of the five and a half inch armor plate is further supplemented by a four and a half inch rolled plate: so that in the section of the turret's entire circumference which will be exposed to the shot of an enemy, the defensive powers of the turret will consist of, from outwards, ten and a half inches of iron, three and a half inches of teak, five inches of three-quarter inch iron trellis work, ten-inch iron T-shaped ribs filled in with teak, and the inner iron skin. The outer circle of armor plates is to be bolted, or 'married,' as we believe it is technically expressed, round the turret's upper rim, to a massive iron ring nineteen feet in diameter, of fourteen-inch by two-inch iron, and weighing two tuns nine hundred weight. This part of the turret's defense will extend to just beneath the upper deck, but is strengthened and protected by a massive iron rim, wrought in sections and riveted together in the strongest possible manner; the armor-covered portion of the turret projecting above the upper deck, and with the rim, being together in shape exactly like a broad-brimmed coachman's hat of the olden times. The turret itself of course rests with the guns and their carriages upon a massive circular platform or turntable, the outer rim of which is fitted with a ring road of stout iron teeth, by applying to which a cogged wheel, worked by a winch by eight or less men at the handles, as may be required, the turret is made to revolve upon the machinery below. During the recent visit of the Admiralty to Portsmouth, the foremost turret, complete in all respects except its armor plating, which, however, was represented in its weight by its equivalent in pigs of iron ballast, revolved in a complete circle in four minutes and forty seconds with eight men at the winch handles; and in the presence of Mr. Reed, Chief Constructor of the Navy, a quarter circle was turned and back again the same distance in one minute. Subsequently, however, with eight men at the winch handles it has turned a quarter circle in twenty-three seconds, or a complete circle in one minute and thirty-two seconds, thus enabling the two guns in the turret to be brought to bear from one broadside to the other in forty-six seconds.

"The *Royal Sovereign's* turret 'machinery,' with the bed upon which it rests, we will now endeavor to describe, premising that the diameter of the turret is less than that of the turntable or the machinery upon which the turntable revolves. Level with the ship's lower deck, or, as it must now be, her main and lower deck both, upon upright timbers from the ship's keelson, are laid logs of teak about twenty inches square, and extending over a space of nearly eighty feet in circumference. On these square timbers has been constructed the bed proper which supports the turret, turntable, and machinery. It is in appearance a gigantic cart-wheel, twenty-six feet in diameter; the nave and periphery being constructed of English and American oak, the periphery entirely

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of banded strips of American, and the spokes of English oak. The periphery of the wheel measures twenty-four inches by twelve inches, and the spokes each eighteen inches by twelve inches, all fitted with the nicest accuracy, and bolted down immovably to the square logs of timber resting on the rights up underneath. The axle to this monster wheel exists in the iron cylinder, which will give entrance to the magazine below from the turn table, and which, twenty-six inches in diameter, seven feet six inches in length, and three tuns each in weight, are fixed upright through the center of the wheels nave; two cast-iron collars, each six feet in outer diameter, and each some hundred weight, being fixed, one on the upper and the other on the under side of the deck, and securing the axle or cylinder thus in its position immovable as a rock. The upper part of this cylinder, therefore, projects upwards of two feet from the wheels nave, and becomes the pivot upon and round which the turntable and turret revolve. From a brass collar which encircles this cylinder, next the nave of the wheel, radiate outward twenty-four iron rods, on the outer ends of which are fixed twenty-four beveled iron wheels, eighteen inches in diameter and nineteen inches broad, and which set in a double circular iron framing, work round a metal roadway, laid on the periphery of the wheel, a second brass collar round the cylinder being fitted with a set of small brass beveled wheels, the turntable thus fitting over and round the cylinder or axis, and resting with its inner circumference on the small brass rollers which encircle the cylinder, and its outer circumference upon the twenty-four beveled wheels, which work upon the iron railway laid upon the periphery of the wheel. Every part connected with the iron work of the turret, and which is being executed under the superintendence of Mr. A. Murray, Chief Engineer to the Admiralty at Portsmouth, is very massive in its character, and is beautifully finished, and so far as any judgment may be formed at present, there is nothing to suggest the slightest fear of the *Royal Sovereign's* turrets revolving freely under the heaviest storm of shot that can be brought to bear upon them, or under circumstances of the greatest possible inclination which may be given to the ship's deck in the roll and tumble of a channel sea. Revolving on an immovable central axis as does a steamship's paddle wheel, it certainly appears that even fifteen or twenty degrees of inclination should not interfere with the turret's working. The side armor of the ship, five and a half inch plates, from the Atlas Works, Sheffield, are supported behind by three feet of solid timber, which is strengthened and supported in its turn by alternate wood and rolled iron beams, placed at one half the usual distance apart, to each of which iron knees of great weight are attached, and by the crossed diagonal iron banding over the inner skin of the ship. The alternate wood and iron beams are covered with one-inch iron plates, all of which at their butts and edges are riveted together with four-inch straps of one-inch iron. Stringer plates also run fore and aft this iron deck. Over all this iron is now being fixed the upper deck proper of the ship, which consists of six-inch oak plank, and over a certain circumference of this oak planking, in the immediate vicinity of each turret, will be fixed the ring of tapered armor-plating, which will form the glacis of each turret at its base. The ship, owing to the fact of her having been converted from a Symondite three-decker, will necessarilly draw too much water to maneuver close in with the shore in shallow waters; but she will doubtless be, when completed (if armed with guns equivalent in their power to the American monitors), the most formidable ship of war in the English navy, whether for purposes of offense or defense. Such is the *Royal Sovereign*, the first of England's turret ships: a vessel that, if armed with weapons of offense equal to her defensive powers, may stand a favorable comparison with the best of the American monitors. When completed and ready for service, however, it might be a wise act to take her outside the Wight, and give each of her turrets a concentrated broadside of 68-pounders from a steam frigate going past at full speed. Such an experiment, startling as it may seem at first sight, would most probably save the country some millions sterling during the next few years, whether the *Royal Sovereign* proves to be a successful or unsuccesful experiment as our first turret ship. We, however, believe she will prove the former."

We simply present this—the most accurate account, we suppose, of the representative iron-clad of England—without indulging in any comment whatever upon the mechanical value of the several arrangements mentioned. The *Dictator*—the largest iron-clad we have as yet—will soon be launched and tried. This (to be) famous ship is on the general principle of the monitors, though greatly modified in detail, and it is confidently predicted by her builders that she will be an excellent sea boat. The turrets are much larger in diameter than those on the smaller batteries; they are 15 inches thick, and we believe 28 feet in diameter; the overhang of the side armor shelves is reduced to almost a nullity; and the side armor itself is 10½ inches thick, backed with five feet of heavy oak timber. The deck plating we do not know the thickness of, but understand it to be two inches laid on massive wooden and iron beams. The models of the vessels (there are two on the same plan), have as fine lines as a river boat, and with their strong engines, 100 inches cylinder and 4 feet stroke, they should achieve a rate of speed commensurate with their other qualities; certainly far above the ordinary rates of vessels-of-war. They will be ocean steamers, capable of making long voyages, and obtaining a high rate of speed. To these ships may be safely intrusted the task of cruising in search of such unfriendly iron-clads as dare to provoke their wrath, and to the monitors the defense of the coast cities, aided by the permanent fortifications.

It is a most significant fact, however, in the *Times* account given above, that the reporter says (having evidently conversed with persons qualified to criticize the *Royal Sovereign*) that "if the vessel be armed with guns equal to her offensive powers, she may stand a favorable comparison with the best of the American monitors," &c.

It is in no sneering or carping mood that we make these remarks; the engineering skill and constructive talent of the English nation has a world-wide celebrity; but they are slow to learn, and are hard to teach, when prepared to abandon their national prejudices. It is not to be supposed that they would take one of our monitors and forthwith construct a fleet of war vessels upon that plan; but it does seem strange that, with repeated and often dearly-bought experience, they should persist in constructing vessels on principles that, to say the least, have never done any great service, or proved at all useful. The *Dunderberg*, now building in this city, is the only broadside ship, except the *Ironsides*, yet projected or even under way for the Government; and yet she has more massive sides and is a heavier vessel in every way than the *Royal Sovereign;* provided the article copied is authentic. It is true that the casemated portion is not so thick or heavily armed with iron (being only 4½ inches) as the *Royal Sovereign's* broadside; but the *Dunderberg's* turrets are stronger and thicker, iron for iron, than the British ship's, and the vessel will be most heavily armed. It remains to be seen of what utility the teak wood on the *Royal Sovereign* backing will be; and the proposition to give the turrets a broadside from 68-pounders (?) would be of service in convincing the British Admiralty of the invulnerability of their pet ship against such pellets.

If, however, they desire to see how soon the turrets can be demolished, they should import a Parrott 300-pounder, and let fly a couple of broadsides from those guns at their structure; they will, perhaps, receive some new ideas upon the subject of impenetrability. Referring to the "Parrotts," the London *Army and Navy Gazette* says:—"Before such projectiles as these guns carry, the breaching of masonry, whether of brick or stone, is but a question of short time." "Had such guns been available in the trenches before Sebastopol, the Allies would have made short work, not only of the Redan and Malakoff, and *bastion du mat*, but of the shipping and of the forts on the other side of the harbor." "It is undeniable that the establishment of a few of Major-General Gillmore's batteries before Sebastopol, on the 17th of October, 1854, instead of the 'tremendous armament' of which Lord Granville boasted, would have 'knocked the place into a cocked hat' in twenty-four hours."

"Unquestionably the Admiralty would be rather nervous about the result of firing a 450-pound shot against the side of the *Warrior*, at the distance of 200 yards, notwithstanding the experiments," &c. The question then arises, Have the English any such guns? "In face of these facts, we are obliged to record that our scientific officers are of opinion that the best English gun for breaching purposes is the old 68-pounder!" It is a lamentable confession, but it seems to have an excellent effect upon the soul; for the *Army and Navy Gazette* deduces the following remarkable bit of philosophy from the startling facts which have been revealed to it: "Do not let us pooh-pooh the Americans. If we are wise, it is the last thing we ought to do."

When our own iron-clads are afloat, we may safely repose confidence in them. The monitors are impregnable so far; and if rightly handled, will do all that is claimed for them. That the ocean ships will also achieve fame, and be an additional safeguard to this sorely-pressed Republic, is a matter of *not the slightest question.*

The Capacity of our Artillery.

A recent editorial in the *Tribune*, commenting upon the artillery in use before Charleston, is thus replied to, apparently from an official source:—

"Has any one devised a more effective gun than Parrott's 8 and 10-inch rifles, for range and boring power, and a more formidable smashing piece than the 15 inch navy gun, cast hollow, on Rodman's method? The trial 15 inch navy gun has been fired, at the Ordnance Yard, Washington, more than 700 rounds; 60 of which have been with 60-pound charges of cannon powder, whose initial velocity has been full 1,500 feet—the lesser weight of charges decreasing proportionately to 35 pounds; and yet, under these severe tests, the gun shows no sign of weakness or decay. And this, too, in the last 200 fires, with the gun reduced on a taper along the chase to 3 inches of its original thickness at the wall of the muzzle. The 13-inch gun spoken of has been laid aside by the Navy Ordnance, and only two of that class are now in course of construction (of wrought-iron) by Mr. Ericsson. These guns are yet to be proved. Meanwhile the navy 15-inch gun has been so far modified as to admit of its use in the monitor turret ports, designed for the 13-inch guns, in view of removing the necessity of a smoke box, by running the chase of the piece through the port-hole, and thus gaining the advantage of two inches greater diameter of shot with less opening of port for the original 15-inch. The calibre of the navy 15-inch was suggested by Mr. Fox (the plan was Dahlgren's); the mode of fabricating, Rodman's."

If this is true, why in the name of common sense don't the authorities practice on Moultrie with 40 or 50-pound charges.

Closing of the American Institute Fair.

The Fair of the American Institute closed on the 25th ultimo. In previous numbers of the Scientific American we have given a brief synopsis of the salient features and inventions on view. We understand that the Fair has not been a pecuniary success; the building being required for other purposes soon after the Exhibition was well under way. We very much missed the usual feature of former fairs—machinery in operation—and heard many remark that this was the one thing wanting to make the scene spirited and enlivening. We append a brief account of the number of medals awarded in the several departments. We are not able to specify the several successful parties, as it would occupy more space than is at our disposal.

Of gold medals, there were awarded in all five; of silver, including cups, there were awarded in all sixty-six. A quantity of bronze medals and diplomas were also awarded to various persons.

Post ge Stamps.—"The invention of postage stamps," says the *Monde* (Paris) "is far from being so modern as is generally supposed. A postal regulation in France of the year 1653, which has recently come to light, gives notice of the use, for Paris, of post paid tickets, instead of money payments. These tickets were to be dated and attached to the letter, or wrapped round it, in such a manner that the postman could remove and retain them on delivering the missive. These franks were to be sold by the porters of the convents, prisons, &c., at the price of one sou.

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Correspondence

Performance of our Iron-clads---The "New Ironsides."

[We take pleasure in publishing the following account of the capacities, invulnerability, and machinery, of the *New Ironsides*, and should be glad to receive accounts of other iron-clad vessels from the officers or others on board.—Eds.]

U. S. S. "New Ironsides,"
Off Charleston, Sept. 4, 1863.

Messrs. Editors :—Those who are interested in the success of our iron-clad navy will be pleased to hear of the invulnerability of the pioneer of our ocean iron-clads, the *New Ironsides*. Of the two hundred and thirteen shot and shell that have struck her during the attacks on Charleston, none have caused any serious injury to life or limb, nor any apprehension for the safety of the vessel. The most probable source of danger is from a shot or shell entering the ports. Each port is protected by two port shutters, which are wrought-iron plates that shield the port, on the same principle that the plate covers and uncovers the key-hole of a lock, except that the hinges are on the inside upper corners, instead of the center of the top of the plate, as in the lock. Although these port-shutters are five inches thick, they cannot resist the impact of a shot which strikes them while they cover the ports; and, in proportion to their bending, is the difficulty of working them. The hinges have so little metal around them, that, a shot strikes them, the shutters almost invariably drop off. Both of these defects, however, can be easily remedied. The rebels have paid particular attention to the water-line and machinery of the ship. The water-line bears the imprints of ten 10-inch solid shot. The most serious damage resulted from two shots striking the same plate, within a foot of each other, and within a foot of the end of the plate. The result was, the partial cracking of the plate, bending it, and forcing it about an inch into the wood-work. It occasioned no leak in the vessel.

The method of fastening the plating to the sides of the ship is very effective. It consists of common wood-screws, put through the plates from the outside, and tapped into the wood, having cylindrical heads countersunk into the plating and flush with the outside. Several of these screw-bolts have been struck directly on the head without causing any damage, whereas, if the ordinary plan of using through bolts or rivets had been adopted, it is very probable that some persons would have been injured by fragments of the bolts being projected inside the ship. Captain Badger was seriously wounded while in the turret of the *Patapsco*, by being struck by one of the bolts that held together the several plates that compose the turret. Several 10-inch solid shot, and one 11-inch, have passed through the unprotected part of the bow and stern; but so much of their momentum was lost in the passage, that they did not reach the wrought-iron bulkheads that cross the ship forward and aft, and which would have effectually stopped their further progress. The 11-inch shot came from one of the guns of the ill-fated *Keokuk*. It was originally a poor casting, and the rebels apparently had to turn one-half of it in a lathe before it would fit the gun.

The appearance of the smoke-stack indicates good shooting on the part of the rebels. A dozen shots and fragments have passed completely through it, all of them within fifteen feet of the deck. One shot would undoubtedly have passed into the boiler, but that it was deflected by the wrought-iron grating in the smoke stack, placed there for that purpose. The projecting wood-work on the spar deck is torn into shreds, and one-third of the rail is completely carried away.

It is claimed for the *Ironsides* that she is equivalent to any six of the monitors. It is certainly the case that when she brings her broadside to bear, and opens fire on the rebel batteries at a thousand or twelve hundred yards range, the rebels very soon leave their guns and take to their bomb-proofs. They have so much respect for her shelling propensities that, although often at anchor within their range, taking in ordnance or coal, they do not disturb her. An idea of her capacity for distribution may be formed from the fact that, in the attacks since the 7th of April, she has fired 4,439 shells, 3,333 having been fired at Fort Wagner.

Of the machinery it may be said that it combines, with neatness of design and excellency of workmanship, that most essential requisite in the machinery of an iron-clad—simplicity. It consists of two horizontal, direct-acting engines, with one surface condenser in common, and a double-acting air and injection pump to each engine. A double-ported balanced steam slide valve to each engine, cutting off by the lap at two-thirds of the stroke of the piston, and each worked by a link motion, constitutes the principal portion of the machinery. Four horizontal tubular boilers furnish all the steam required. The engine room is the finest of any screw ship in the service, while the fire room is about the most uncomfortable of any vessel of her class. During a late attack, with the fires spread and the furnace doors open, the temperature was 170°. This is, of course, the extreme; the ordinary temperature, however, being 120°. Two blowers with their separate engines, are arranged to supply air to the fires, or to force air on the gun-deck during action. The latter is the only purpose for which they are used. The greatest defect in the ship, not connected with its invulnerability, is the want of ventilation on the berth-deck. The ward-room has the benefit of a windsail and air-ports; but the steerage, in which seventeen officers have to live, has no ventilation whatever. Each room is nothing better than a box. Officers enter their mess-rooms, eat their meals, and then rush on deck to get fresh air. There is not even a windsail, although there are two hatches, communicating with the spar-deck, in which they could be placed. An expenditure of a little time, and less money, applied to the construction of air tubes leading to the blowers, with branches leading into each room, would result in the officers' enjoying health and comfort.

An Engineer in the U. S. N.

A Coal Oil Trap.

Messrs. Editors :—The people residing along the Ohio river and some of its tributaries, are much annoyed by the coal oil which is constantly found floating upon the water. It makes its escape from the wells and from the barges used for conveying it to market. The amount thus running to waste is exceedingly great; and it would certainly be a matter of economy if means were devised to remedy the evil. Bathers are also immoderately anointed, much to their disgust; boats of all kinds are besmeared; fish are spoiled; the water is rendered unpalatable, and property is sometimes endangered—as was the case lately at Pittsburgh, when the fireman on a ferry-boat carelessly threw some live coals overboard, a great conflagration being the result.

A simple, cheap, and effective trap for arresting the oil might be constructed in the following manner :—Take several logs of proper dimensions, and at some point where the channel lies about the middle of the river, anchor the logs lengthwise, at an acute angle to the shore (slanting each *up* stream, and allowing it to float upon the surface), preserving an interval of at least twenty feet between any two of them. This may be done upon both sides of the stream, without obstructing the channel. A few lanterns will be a sufficient safeguard at night, preventing accidents from any passing boats.

Philadelphia, Sept. 23, 1863. F. J. C.

[This is quite a novel, and it would seem a useful suggestion. We have no means of knowing what amount of coal oil is annually lost in the manner spoken of by our correspondent, but it would seem to be large. The hint is worth acting upon by those interested.—Eds.]

Cider Mills.

Messrs. Editors :—Are there any successful patentees of cider mills? Can you put me on their track? Which is the more economical, the sweep or tread-mill horse power, for working a cider mill?

Answers to the above would perhaps be of general interest at this season, and would especially oblige

W. T. B.

Sept. 26, 1863.

[There are many successful patentees of cider mills, but the best way for you to communicate with makers of them is to advertise. We have not the addresses of manufacturers of such articles. The sweep power admits of a greater variety and more economical arrangement than a tread-mill.—Eds.

Time to Cut Timber.

A short time since I saw a statement on this subject in a newspaper. I wish to give my own experience and observation for over fifty-five years, constantly working and using most all kinds of timber, more especially oak, ash, and walnut. I have learnt by dear experience, for I have lost much by the effects of worms in my timber, and have found when timber may be cut and have no worms, or powder-post, as it is called. Cut timber from the middle of September to the middle of December and you cannot get a worm into it. October and November are perhaps the best months, and sure to avoid the worms.

You cut from March to June, and you cannot save the timber from worms or borers. May used to be called "peeling time" in my boyhood; much was then done in procuring bark for the tanneries, when the sap is up in the trunk and all the pores are full of sap; whereas in October those pores are all empty—then is the time to cut, and there will be no worms. Whenever you see an ox-bow with the bark tight, there are no worms, no powderpost, and you cannot separate it from the wood; and what is true in one kind is true in all kinds of timber, and every kind has its peculiar kind of worm. The pine has, I believe, the largest worms; and these worms work for many years. I have found them alive and at work in white oak spokes that I knew had been in my garret over twelve years, and they were much larger than at first; they do not stop in the sap, but continue into the solid part. I do not think of buying timber unless it is cut in the time above alluded to.

I have wondered that there has not been more said on this subject, as it is one of great importance, even for fire wood, and especially for shipbuilding, &c. I have already, perhaps, prolonged this article too much. Now I want to inquire of some of the wise of this enlightened age, whence and when do these troublesome creatures come? Have they any parents? how came they in this solid wood? was there an egg deposited that caused the worm, or how did he come into being? We know they are there; and now, will some one please to show us the way, and all about their origin, &c., and they will much oblige your humble servant, Ambrose Kingman.

Reading, Sept. 8, 1863.

[The above is from the *Boston Recorder* of September 18th. The information contained in it is similar to that published on page 163, Vol. VIII. of the Scientific American (current series). In substance it confirms the views expressed in our columns, as to the fall months being the best for cutting timber. Why timber cut in November or December should be superior to that cut in January and February, we cannot explain. Experience is the best teacher in the first place, but some of our naturalists who have devoted special attention to insects and their ravages upon vegetation, may be able to solve the problem. —Eds.

The Monitor Turrets.

Since our last article on the subject of some protection for the inmates of the turrets against bolts dislodged by shot, we have received an additional number of communications proposing remedies. Most of them are ingenious and comprise substantially the same ideas that have been promulgated hitherto. We remarked on the first occasion that the inventive talent of the country was equal to the task proposed to it, and the letters since received prove the assertion; it now remains for the sanguine ones to prosecute their plans to a successful issue, so that the country may derive some benefit from their deliberations and discoveries.

The steamboat *Mary Powell*, running on the Hudson river between New York and Poughkeepsie, lately made the run between the two cities in the running time of 25 miles per hour. She is held to be the fastest steamboat in the world.

A steam carriage, which has been running on the horse railroad tracks in Boston, was matched last week in a trial of speed at Nashau, N. H., against a pacing mare, for a stake of $500.

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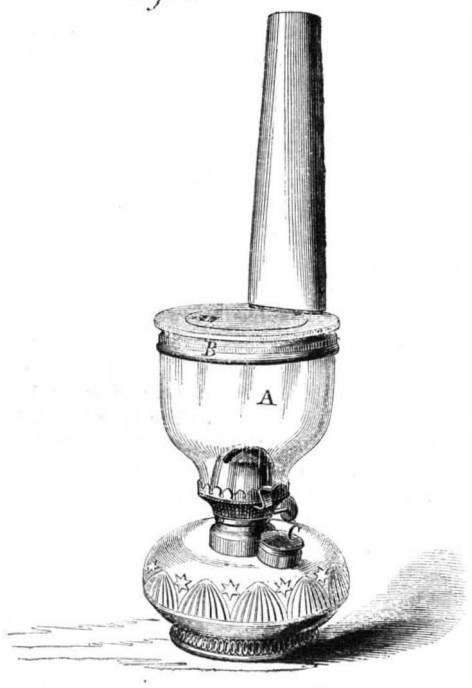
Improved Kerosene Stoves.

The great heat thrown off by kerosene oil in the process of burning has attracted the attention of enterprising men, who deemed that such a waste of caloric was altogether needless. In view of the present high price of coal, it is almost unnecessary to say that every particle of heat that can be usefully employed should be put to some purpose; and when the same lamp that lights the apartment will also warm us and permit cooking to be done by it, it will be seen that a great saving is effected in domestic economy. These lamps are a realization of the true principle of invention, which is, metaphorically, to produce two grains of corn where but one was formerly attained. We do not mean to say that this invention is adapted to raising crops, but that the range of its uses is so wide as to authorize the above simile. It is astonishing to those who have never investigated the subject, to witness the intense heat generated by burning kerosene, and the accompanying engravings represent a new lamp stove invented for the purpose of taking up in a useful manner the caloric which in ordinary lamps is radiated from the chimney and virtually lost. The engravings explain themselves; Fig. 1 having a glass shade, A, surmounted by a metallic band or rim, B, in which is a hole covered with a circular plate, as in all stoves. The band, B, has a nozzle at the back, on which the chimney fits. The shade can be removed the same as in all other lamps, and a chimney of the usual construction applied when needed. In the body of the lamp there is an aperture closed by a brass cap, C, through which opening the lamp may be filled when the oil is exhausted.

Fig. 1



In Fig. 2 we have a representation of a stove, which is supported on a tripod, the heating apparatus, consisting of a two-burner lamp, being placed below; this stove has also a glass shade or globe through which light is transmitted as usual, and a Russia iron casing surrounds the same, terminating in a chimney of the same material. These burners are of the largest size, and the cover will permit a tea-kettle or large iron pot. Frying, boiling—in fact cooking of all kinds—may be done with facility and expedition upon this stove, it being larger, and giving out more heat than the one-burner lamp before alluded to. Any part of the apparatus is readily detached for the purpose of cleaning or replenishing the oil.

Fig. 2

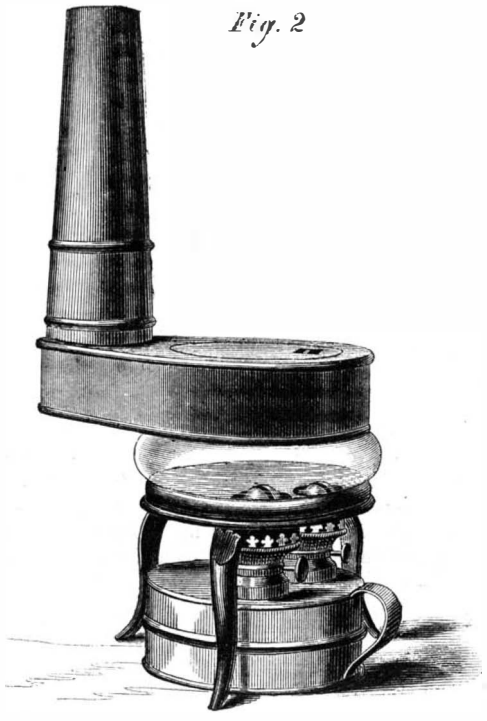


Fig. 3.

EDDY'S KEROSENE STOVES.

Fig. 3 is another form of this heater, which is supplied with three burners, and of course gives a proportionate amount of heat. These stoves are extremely useful for family purposes.

The tedium of the sick room is often relieved by a cup of tea or other light beverage, and frequently gruel and similar nourishment is required by nurses for their patients when the usual facilities for making it are not at hand, or the lateness of the hour interferes with the speedy preparation of it. For all such purposes, and indeed many others not specified, these lamp stoves will be found an invaluable aid and convenience. Mr. Eddy is about to obtain other patents on these stoves to cover certain points omitted in his first patent.

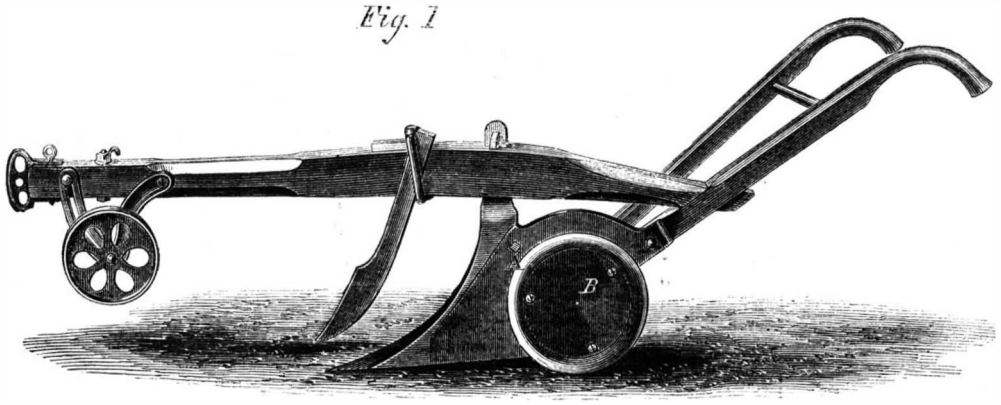
This invention was patented through the Scientific American Patent Agency, on April 7, 1863, by Wm. T. Eddy, of West Hoboken, N. J. For further information address Leslie & Elliot, 494 Broadway, where the article can be had.

Improved Plow.

The fatigue on the team and the labor of guiding large and heavy plows in new soil is very great. This is owing in a measure to the great surface of the landside which has to be drawn or driven through the soil; while the landside is necessary to the construction of the plow and an assistance in running a straight furrow, it is of no further utility on the plow, and might as well be removed, if it were possible to do so without destroying the efficiency of the tool. The plow herewith illustrated is an improvement on others not so constructed, in that the landside is virtually without friction. This feature is attained through the introduction of a revolving wheel, A; this wheel is smooth on its exterior, and is firmly fastened to the mold board of the plow, as shown clearly in Fig. 2; A being the revolving landside, and B a metal disk let into its face. The landside is held to the mold board by the screw, C. It is believed by the inventor that this constitutes an important improvement in plows; it takes off one-third of the draft, and its efficiency and utility will be fully apparent on a trial. An ordinary landside can be attached at any time if required. Large numbers of these plows are now made at Binghampton, N. Y.

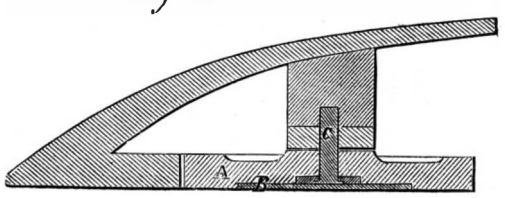
This invention was patented on March 17, 1863, by Samuel J. Olmsted, of the above place. Further information concerning it can be had by addressing the assignees, Ayres, Olmstead & Weed, Binghamton, N. Y.

Fig. 1



OLMSTED'S IMPROVED PLOW.

Fig. 2



Wonderful Scarcity of Ice.—Apropos of the scarcity of ice, one firm in Philadelphia advertises "5000 tuns of ice fourteen inches thick and upwards, frozen at a low temperature, &c." How is this? We thought there was a "terrible" scarcity of the article—so hard to be procured that it was worth two and even three cents a pound; we have paid 5 cents for it ourselves by the small quantity; and we heard that one person in Philadelphia paid $40 for enough to preserve a deceased person. Now we have 5000 tuns advertised as the most probable and matter-of-course thing in the world. How indignant ice-men were when charged with complicity with one another to sustain their prices. And what an abused set of business men they were, to be sure! When the season is nearly over, it is found that one firm alone, in a city remote from the great ice depots, has a surplus of ice amounting to 5000 tuns. When the cry of "Wolf" is raised again, the public will know just what it means.

The value of the personal property and real estate in the State of New York is $1,454,454,817. These figures are derived from the State tax list, and are certified as correct by D. R. Floyd Jones, Lieut. Governor.

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VOL. IX, NO. 15 ... [NEW SERIES.] ..... *Nineteenth Year*

NEW YORK, SATURDAY, OCTOBER 10, 1863.

AMERICAN GUNS.

There are two classes of guns now made for, and used almost exclusively in, the American army and navy. These consist of cast-iron smooth-bores for round shot and shell; and rifled "built-up" guns for elongated shot and shell. The smooth-bore cast-iron guns vary in size from 12-pounders up to 425-pounders—the 15-inch guns, and the "built-up" rifled ordnance, range from 10-pounders to 300-pounders. The 15-inch guns are the largest modern ordnance in the world. The first made of this caliber was the Rodman gun, now mounted at Fortress Monroe. It was cast at the Fort Pitt Works about four years ago, weighs 49,100 pounds, and was illustrated and described on page 305, Vol. IV. (new series) of the SCIENTIFIC AMERICAN. It has been used only experimentally with shells and moderate charges of powder. Its range, however, has been ascertained, and is stated by Captain Benton to be 1,973 yards, with a 320-pound shell, a charge of 35 pounds grain powder and elevation of 6°. With a charge of 40 pounds of powder, elevation 28° 35′, the range is 5,435 yards. Great results were expected from guns of such caliber, and it was proposed to construct several of 20 inches bore; but before such suggestions were acted upon it was wisely resolved to complete several 15-inch guns for the navy, and use them in the turrets of the monitors. After having been tried at Charleston, it is now publicly reported that they have not fulfilled the expectations entertained respecting their destructive powers, that they have been condemned, and are to be replaced with 13-inch guns. On this subject the Pittsburgh *Chronicle* says:—

"These 15-inch guns were all cast in Pittsburgh, and we should be sorry to know that they are failures; yet we confess that opinion is beginning to be entertained. We would like to hear their founders or advocates on this subject, and to know from them whether the efficiency of these big guns would not be increased by rifling."

Their efficiency would certainly not be increased by rifling them; they do not possess sufficient strength to stand the pressure to which a rifled gun is subjected; but the denunciations which have lately been vented against them in several of our daily papers, may be wrong in many particulars. These statements will show that the gun question is in a very unsatisfactory condition; for there are no good grounds to conclude that a cast-iron 13-inch gun will be more effective than the 15-inch one. The largest modern cannon in Europe is the "Horsfall gun," composed of a single forging of wrought iron, at the Mersey Steel Works, Liverpool. It is about 16 feet in length, 13 inches bore, weighs 22 tuns, and has been fired with charges of powder varying from 40 to 80 pounds, behind solid round shot of 283 pounds. At an elevation of 12° its range was 3,883 yards, and at 800 yards distance, its shot smashed through the *Warrior* target, made of 4½-inch iron plates, backed with 18 inches of teak and an iron skin-plate of ⅝-inch. It has not, however, been adopted for the British navy, and its 12-inch companion in the Brooklyn navy yard meets with the same neglect.

The other class, called "Parrott guns," have come into use since our unhappy war commenced. They are rifled, and, in construction, each consists of a cast-iron tubular body, a wrought-iron band shrunk for the reinforce, and a solid breech screw plug secured in the rear. They are manufactured according to two patents granted to Capt. R. Parrott, Oct. 5, 1861, and May 6, 1862. The cast-iron body is bored through the rear, and the band is shrunk for the reinforce, while the body is being rotated and cooled in the interior with a stream of water. This mode of shrinking the coiled hoop on the tube produces a most perfectly banded gun. Such ordnance has acquired a high reputation at Charleston and other places, for strength, accuracy and range. A 10-pounder of 2·9 inches bore has a range of 600 yards, at an elevation of 1°; and, at an elevation of 20°, a range of 5,000 yards. A 100-pounder, of 6·2 inches bore, has a range of 1,450 yards at an elevation of 3¼°, and a range of 8,463 yards at an elevation of 35°; the charge being 16 pounds of powder, with an 80-pound shell. The 200-pounder is an 8-inch bore; the 300-pounder a 10-inch bore, and their respective ranges exceed 5 miles. At Charleston, the 300-pounder was burst by a shell exploding before it reached the muzzle—no fault of the gun.

It is known that American smooth-bore cast-iron guns surpass those made in Europe for strength; but it has been supposed that the Armstrong and the Whitworth rifled guns excelled those of all other nations. Those who have devoted attention to such subjects entertain a different opinion. After expending $12,500,000 on Armstrong guns, we learn that they have lost their high reputation; and Sir William Armstrong has ceased to be the Government gun-maker. The Whitworth gun, which has been so much lauded, obtained its fame from the character of its rifling, and not on account of its superior construction; and no better evidence could be furnished respecting the superiority of American guns, than to state that Mr. Whitworth has lately taken out a patent in England for making guns upon the Parrott principle, except in using a forged soft steel barrel for a cast-iron one. He has the body made of a tube, over which is a wrought-iron shrunk band, for the reinforce, and the breech is closed with a solid screw plug. Upon this principle Mr. Whitworth will now be able to manufacture much stronger guns than he has hitherto done.

Banded or "built-up" guns are old; but to Professor Daniel Tredwell, of Cambridge, Mass., belongs the credit of reviving and improving them. In 1840, he constructed three 4-pounders, and in 1844 four 23-pounders. They withstood the Government tests, and were intended for the navy; but the old Navy Board gave them no encouragement. In 1843, the first English patent was issued for a banded gun, to John Frith; in 1852, one was granted also to A. Krupp, of Prussia, for a banded steel gun, and in 1855 one to Captain Blakeley, who claimed hoops of steel, wrought-iron and coiled wire, shrunk over the cylinder, applicable to strengthen both new and old guns. Captain Blakeley makes the best banded guns in Europe, as a private manufacturer, and he has furnished some capable of carrying 400, 500 and 600-pound elongated shells. But after examining into the published statements of results attained by modern European guns, we confidently believe that those which are now manufactured in America surpass them for strength and range. Practical warfare has developed defects which could not have been ascertained by common experiments; and failures, faults and deficiencies, have led to such improvements in fabrication as have placed them in the front rank of modern ordnance.

A TRAP TO CATCH A SUNBEAM.

The comfort, convenience, and economy of social life depends very often upon a knowledge of the elementary principles of science. Thus acoustics, as exemplified in the speaking tubes; thermotics, or the laws relating to heat; pneumatics, or the exclusion of drafts and the introduction of a proper amount of fresh air to our dwellings; these and kindred branches of science are all laid under contribution to furnish forth our homes in luxury and refinement. The mere fact of the existence of fixed laws and principles confers no especial benefit upon humanity, and it is only when one's brain feels active through breathing fresh air, or the body is warmed by the radiation of heat from a comfortable stove, that we acknowledge the benefits science is capable of conferring, and realize them in a practical manner. Therefore, to be of service to man, the hints afforded by even the simplest ray of light should not be neglected. We speak of light, because that is the most inestimable of all gifts conferred upon man.

The first fiat of the Creator was "Let there be light;" and from that hour to this mankind struggle and pray for it, and pine away when deprived of its genial life-giving rays. In too many of the homes of the land sunbeams are as rigidly excluded as if they carried some death-dealing miasma or subtle poison, instead of bearing, as they do, balm and healing to every house. Dark corners and close little rooms abound, from which every beam is shut out; and human beings wilt in such places as surely as a plant will under similar conditions. A very simple way to obviate such trouble is to erect reflectors to throw in light obliquely where it cannot enter directly. If men will persist in so building their apartments that direct illumination cannot be made, the following simple arrangement will effect a thorough reform in this important particular:—

Procure a small iron rod, say half an inch in diameter and three feet long, and fasten it to the side of a window-frame by suitable brackets, so that it will turn easily like a blind: to this rod rivet flat bars of hoop-iron, 2 feet long, at right angles with it. Over this framework stretch a white cotton cloth, and the reflector is ready for use. It is easy to see that any side light striking upon this cloth will be reflected into the apartment where it is erected, with an intensity varying according to the angle it is fixed at. If tin be substituted for cloth, the improvement will be very great. If the apartment is more easily lighted from above, the reflector must be fastened over the top. Reflectors are used in many places in large cities, but they are differently made and have greater illuminating power. Such an apparatus as is here described will be found useful in places where others are unattainable.

THE PITCHES OF SCREW THREADS.

If there is any one thing in the transactions of the machine-shop more incomprehensible than another, it is the want of some settled size or number for screw threads. It would be just as sensible for every machine-shop to use its own standard of length, as it is for them to employ unusual and fractional pitches for common use. The Whitworth gage is generally allowed by most experienced persons to be well proportioned and a desirable one for adoption. If it is found by practical experience that this one does not meet all the requirements of every-day duty, it is very easy to modify it until correct. But whether the Whitworth standard or any other be fixed upon, it is vitally important for the interests of all trades that use bolts and nuts that some standard be agreed upon and religiously observed. As the case now stands, a wagon-maker, a miller, or a country machine-shop in small practice, may have a great many dollars worth of bolts and nuts kicking around under foot; but not one single bolt of the quantity will fit any nut. Some have twelve threads to the inch in ⅝th bolts, some eleven, others eleven and a half; in short, there is no end of division and sub-division. There is no use for a fractional thread under any circumstances, and it is always better to make an even number of them, unless indeed the work be special.

The stores are full of steel scales, in sub-divisions of a foot, all approximately accurate. Wire makers have a standard gage by which they regulate their manufacture; gas fitters and pipe makers cut their threads so that any nipple will fit any pipe, and they have a regular and specified number of spaces to the inch. It is left to the bolt and nut makers alone to pursue a totally independent course in this matter, and to make and vend their wares wholly uninfluenced by the public needs in this respect.

What is wanted to remedy this matter is simply an agreement between a few of the leading manufacturers to adhere faithfully to one standard; or, if this is found inoperative, to instruct members of the legislature to offer a bill bearing on the subject, to regulate the standard by law. Such measures are probably unnecessary, as those who are interested would doubtless come to some conclusion on the subject, if they met together for the purpose; in any event, economy and convenience alike demand that early attention be given to the regulation of the pitches of screw threads.

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ENGINES OF THE "PURITAN" AND "DICTATOR."

These two magnificent vessels-of-war now fast approaching completion will certainly be unsurpassed in their speed and invulnerability. We do not suppose that twenty miles per hour will be got out of them, as is stated; but we do think that three-fourths of it is not too much to expect when their models and engines are considered. We have had an eye on the construction of the machinery for some time, and have taken great interest in it. The following details will be found of general interest:—The cylinders are 100 inches in diameter, and the piston has 4 feet stroke; they are "kettle bottomed," being cast solid, of the same shape as that utensil named; they are 2½ inches thick through the sides, and have 4 strong lugs by which they are held to their places. They stand vertically, and have no bed-plates; in fact there are none for the whole engine, but the cylinders are bolted to two massive wrought-iron kelsons, 10 feet deep and some 24 inches or more in width; four huge bolts secure each cylinder to the kelsons. The cylinders are both in line, athwartships, and have large slide and expansion valves, the latter working over the former; in each valve there are two stems which proceed to strong cross-heads working between vertical guides on the end of the steam chests. The chests are bolted, not cast to the cylinders.

A peculiar feature of this machinery is the absence of guides, cross-heads, and other cumbrous parts. The piston has a trunk attached to it, but the engines are not, strictly speaking, trunk engines. The usual connection is attached to the bottom of the piston, runs up the trunk, and takes the end of a lever attached to a vibrating shaft running fore and aft; this shaft transmits the power of the piston to the propeller or screw shaft; it is supported in wrought-iron blocks, with brasses, as usual, and has a vertical lever placed on it, from which the main connecting rod proceeds directly to the crank pin; these are the principal parts. The vibrating shaft blocks are bolted to the kelsons (of which there are six in all), and there is one shaft to each cylinder, making two shafts, two connecting rods, and two trunks between the pistons and the crank pin. The air-pump is placed inside the condenser, and worked by a lever on the end of the vibrating shaft. The condenser is of the old-fashioned jet variety, and sits directly aft the cylinders. The shaft is 21 inches in diameter, is 72 feet long in several sections, and works in a tunnel or alley way made for it.

The boilers have 56 furnaces, and an aggregate grate surface of 1,100 feet; allowing 12 pounds of coal per square foot of grate surface, the vessel will require at the least 175 tuns of coal per day, of 24 hours steaming at full speed.

These engines are precisely similar in all respects for each vessel; the propeller is 21 feet 6 inches in diameter, has 32 feet pitch, and weighs 39,000 pounds; there is no out-board bearing for the shaft. What piston speed will be obtained from the engines remains to be seen; we hope that the highest expectations of the builders, and the designer, Captain John Ericcson, will be attained.

COATING IRON, WHITE COPPER, AND BRASS.

Articles made of wrought-iron soon become rusty when exposed to a moist atmosphere, owing to the affinity which the metal has for oxygen. Cast-iron contains more carbon than wrought-iron, and is not so liable to corrosion; nevertheless all articles of cast-iron require to be coated with some substance to protect them from rusting. Copper exposed to the atmosphere, or to water, resists corrosion in a superior manner; hence it has been sought to coat iron with a thin skin of copper. Articles of cast and wrought-iron may be coated with copper by two modes; namely, dipping in molten copper; and by electro-deposition. The most simple method of electro-deposition is executed without a galvanic battery, and the process is quite old. It consists in making the surface of the iron bright, by scouring or otherwise; then dipping into a strong solution of moderately warm blue vitriol (sulphate of copper). By electrical affinity, a small quantity of pure copper is deposited from the solution, on the surface of the iron, in a thin coat. The articles should be quickly removed from the solution, washed in soft warm water, and dried in sawdust. The copper thus deposited on cast and wrought-iron articles, is liable to become black on the surface afterward by the formation of oxide; and the copper also wears off rapidly, because it is so thin. However, by dipping them into varnish, then drying them, the surface will be protected from the atmosphere. It would cost too much to turn or file cheap cast iron articles, to prepare them for being coated with copper; but they may have their oxide removed entirely by agitation in warm dilute sulphuric acid, at the rate of 1 pound of acid to 10 of water; after which they may be scoured by agitating them with sand and water in a barrel-like vessel rotated on journals. But in addition to the simple deposit of the copper solution without a battery as described, a thicker deposit of copper will be secured by using a battery in the common way in which copper is deposited as in electro-plating.

Another method of coating iron with copper is by dipping it into fused metal. In all such operations the iron must first be cleansed and perfectly freed from oxide, scouring with sulphuric acid being the cheapest method of effecting this object. The clean iron is first immersed in a bath of the stannate of soda for a few minutes; which is made by dissolving one pound of the stannate (tin dissolved by soda and forming a white salt) in one gallon of water; then taken out, dried, and drawn slowly through molten copper contained in a crucible. Another method consists in dipping the clean iron articles in a bath of the muriate of zinc and tin (tin and zinc dissolved and saturated in muriatic acid), at the rate of one pint of the muriate to five of water; then taken out, dried, and dipped in the molten copper as already described. Instead of copper, brass and German silver may be the molten metals employed to coat the iron; the same process will answer for all these metals. In each case, the surface of the molten metal in the crucible or melting pot should be covered with borax in powder, and some ground glass. When the articles lifted out of the molten copper have become cold, they assume a blackish appearance from the absorption of oxygen. This is removed by dipping them into dilute muriatic acid, then washing in warm water, and drying in sawdust. Iron nails, and other small articles may thus be coated with copper, brass, or German silver. In all attempts hitherto made to coat iron with a thick coat of copper or brass, some medium between the iron and copper seems to be necessary. Tin or zinc will answer; hence the use of the solutions of tin and zinc described, to prepare the iron for receiving the copper. In coating iron with brass, the common method is to give the iron a coat of tin first.

An Absurdity.

"Every kind of artificer can be found in Gen. Grant's army, and their skilled labor is called into frequent operation. An ample supply of rolling stock for the railroad from Vicksburg to Big Black has been improvised by them. The trucks were cast, and the remainder of the engines gathered from the debris of destroyed engines by piecemeal. Part came from the Tennessee roads, part from Kentucky, and other parts from Mississippi. From such materials were made good, neat, and strong locomotives in a very few days."

[This is very good for a paragraph, but it happens to be an impossibility. No such thing could occur. Engines have to be made with great care, and to say that pieces taken from different machines 500 miles from each other would fit accurately, is paying a compliment to machinists which though flattering is impossible. Cases may occur where one piece of machinery will fit an engine it was not made for; but these are extremely rare, and do not occur once in a lifetime.—Eds.

Wool Abroad.—During the first seven months of the present year, as we learn from late English exchanges, 93,608,625 lbs. of wool were imported into England, against 86,652,325 lbs. in the same period last year. Most of this wool came from British possessions abroad, Australia alone furnishing 44,311,317 lbs. Of the above amount 8,518,040 lbs., were exported to the United States, besides 572,340 lbs. of English grown wool.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Horse Shoe.—This invention consists in applying vulcanized india-rubber to a horse shoe, in such manner that a firm connection of the rubber to the shoe is obtained, and the feet of the horse prevented from clogging up with snow or "balling," as it is technically termed, and the feet also prevented from slipping; while the feet are prevented from being subjected to the jars and concussions which are the fruitful source of disease in horses, especially if driven over pavements in cities. The above improvement is the invention of O. A. Howe, of Fort Plain, N. Y., and the patent bears date Sept. 15, 1863.

Railroad Car Brake.—This invention consists in a novel means employed for operating the brakes of a series or train of cars; the several parts being so arranged that, by actuating a single lever on the engine or locomotive, all the brakes may be applied simultaneously or nearly so, thereby avoiding the necessity of a plurality of brakesmen, and placing the whole power of the brakes and the manipulation thereof under the control of the engineer. The above improvement is the invention of Augustine Irel Ambler, of Chicago, Ill.

Surgical Splints.—This invention consists in a surgical splint, stamped or otherwise produced, of sheet metal instead of wood, said metal being provided with a series of perforations so that secretions or lotions which may come in contact with the splint will evaporate quickly, thus avoiding the necessity of frequent changes of the wadding, and producing by the evaporation itself a beneficial cooling effect on the limb. The metal is protected against oxidation by Japan varnish, and it is strengthened by curves or beads. This splint, according to the occasion for which it is to be used, is also provided with a peculiar device for the purpose of adjusting the same to the axis of the joints of a limb, and the foot-plate is set upon springs and provided with hinged screws which allow of adjusting the same to the desired position of the foot. The above improvement is the invention of Charles Wittmann, of Brooklyn, N. Y.

Quoins and Furniture for Locking up Forms of Type.—This invention consists in the construction of the quoins in the form of rollers, with surrounding recessed teeth or cogs, and the furniture with racks or series of teeth or cogs to gear with the said teeth or cogs on the quoins, such quoins being applied to roll between the furniture and the chase or between the two sticks of furniture, and being turned with a key to move them from a wider to a narrower portion of the paper space between the furniture and the chase or between the pieces of furniture, and thereby made to tighten up the type in the page or pages and tighten up the page or pages in the chase. R. Hoe & Co., of New York are the assignees of this patent. The above improvement is the invention of Hippolyte A. Marinoni and Francois N. Chandré, of Paris, France.

Means of Directing Motion in Right Lines.—There are many instances in machinery in which the direct application of fixed guides to a body, which is what is termed "parallel motion" has been used, but this does not produce a perfect rectilinear movement. The object of this invention is to obviate the imperfection of the "parallel motion," and to obtain a perfect rectilinear movement of a body without the application of fixed guides directly to it; and to this end it consists in the combination of one or more oscillating and longitudinal moving arms by means of an attached slide or roller with a fixed arc or curved surface, whereby a certain point in the said arm or arms is caused in its oscillation to describe a right line and to produce a rectilinear movement of any body that is attached to it at that point. The above invention is due to Andrew Buchanan, of Jersey City, N. J.

Joint for the Tubes of Surface Condensers.—The principal object of this invention is to provide for the removal of any one of the tubes of a condenser for repair or any other purpose without disturbing the others, and at the same time to provide for the free longitudinal expansion of the tubes, and to this end it consists in forming the joint between a tube

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and tube sheet by means of a thimble passing over the end of the tube and screwing into the tube sheet, and a ring or gasket of india-rubber or other packing material which is inserted into a cavity in the sheet and compressed around the tube by means of the thimble, in such manner as to make a steam-tight joint, but freely permit the longitudinal expansion of the tube. It also consists in the construction of such thimbles with their openings of circular form at their inner ends for the reception of the tubes, but square or other polygonal form at their outer ends for the reception of a wrench or key by which to screw them into their places. Measures have been taken to secure an English patent for this invention. The above improvement is the invention of John V. V. Booraem, of Jersey City, N. J.

Mold for Casting Printer's Type.—This invention relates to molds for casting type either singly or several at a time from any material, more especially type made of a mineral composition which is in a plastic but not a fluid state at the time of molding. It consists first, in certain constructions of the mold whereby facility is afforded for detaching the type from them; second, in certain means of insuring the registering of the molds with the matrices; and third, in a certain mode of applying a receiver for the material of which the type are to be made, a plunger for pressing the material into the molds, and a cut-off for separating the molds from the receiver, in combination with each other and with the mold box, whereby great facility is afforded for casting the types, and for removing them from the mold after casting. The above improvement is the invention of R. W. Davis and D. Davis, of the City of New York.

Device for Gilding Moldings.—This invention consists in the employment of a tip or brush applied to an arm which is attached to or connected with a slide and has a spring bearing against it; all being arranged in such a manner that the operator can, with the greatest facility, remove or take up the metal leaf from the book or pile and deposit it upon the molding. The invention also consists in using, in connection with the tip or brush arranged as above specified, an endless apron arranged to operate conjointly with the brush slide, in such a manner as to admit of the leaf, when applied to narrow moldings, being cut by the operator into strips of a width to suit the moldings. The invention further consists in a means employed for feeding the molding to the brush, the feed mechanism being arranged to operate conjointly and automatically with the brush and endless apron. The above improvement is the invention of Robert J. Marcher, of New York City.

Applying Power to Car Brakes.—This invention relates to an improved mode of applying the power to that class of car brakes which are actuated from the locomotive, and it consists in the employment of a friction wheel applied to an adjustable shaft having a screw upon it, which by actuating said shaft, may be thrown in gear with a worm wheel on a shaft having a loose drum upon it and connected with the shaft by means of a spring pressing one end of the drum in contact with a conical hub attached to the worm wheel; all being arranged in such manner that the brakes of a train of cars will be in complete control of the operator or engineer. The above improvement is the invention of A. I. Ambler, of Chicago, Ill.

Instrument for Taking Soundings.—The object of this invention is that of taking soundings from vessels navigating shallow waters without stopping or checking the speed of such vessels. The principle is of a self-acting nature, the depth of water being at all times shown by a self-adjusting index. It is a well-known fact that there is a certain fixed relation between the pressure and the depth of water, and that, therefore, if the pressure of the sea at a certain point below the surface be known, that pressure accurately indicates the depth. This invention is founded on these physical facts. An elastic air-tight bag is inclosed in a small metallic vessel attached to a tow line secured to the vessel. An india-rubber tube is connected with the bag by an air-tight joint. This tube is lashed to the said tow-line with its upper end put in communication with an ordinary pressure gage. This pressure gage is graduated in such a manner that its divisions correspond with the pressure produced by one foot column of water. The index of the gage, therefore, in place of showing as usual the number of pounds of pressure to which it is subjected, will show what column of water corresponds with the pressure within the gage. In other words, the index will show how far the instrument is immersed below the surface of the water. Thus, by mere inspection the depth of water may at all times be accurately ascertained, without the inconvenient and inaccurate process of heaving the lead as hitherto. The above improvement is the invention of John Ericsson, of the City of New York.

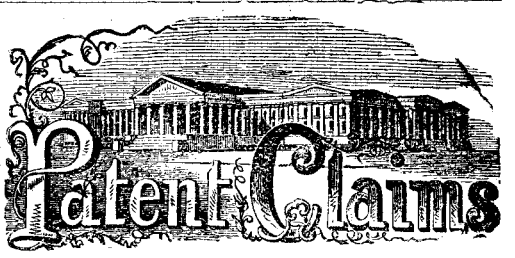
Mode of Applying Brakes to Cotton Lappers, &c.—In lappers and breaker cards and other machines for condensing a number of sheets of cotton or fibrous material into one sheet or lap, a friction brake is employed to produce the necessary pressure on the roll around which the lap is wound, to give the lap the required degree of compression; and this brake requires to be thrown out of operation when the lap has attained its full size and is ready to be taken out and to remain inoperative while the full lap roll is being removed and a fresh one substituted, and be brought again into operation on the starting of the machine to commence the formation of a new lap. The brake is usually kept in operation by means of a weight attached to a foot lever or treadle, and when it requires to be thrown out of operation the attendant has to press his foot on a treadle to raise the weight, and this pressure has to be continued to keep the brake inoperative while the roll is being changed. The object of this invention is to render the brake automatic, and to this end it consists in combining it with the shipper or other device which stops and starts the feed rolls of the machine in such manner that it is thrown into operation by the act of starting the feed rolls and out of operation by the act of stopping the said rolls.

Machinery for Preparing Cotton &c.—In preparing laps for carding, some attempts have been made to combine an opener and a cleaning trunk with a lap-head for the purpose of forming what is known as a breaker lap, but such combination has never been made to operate with perfect success, owing to the difficulty of combining a suitable number of draft cylinders at the mouth of the trunk to prevent excessive back pressure on the opener and in the trunk, such pressure causing the fiber to be badly curled and to come out in bunches. It has been common, in connection with such combinations, to use a blow-fan on the opener to drive the cotton through, but this tends to pack the fiber in the trunk and cause it to become choked up. This invention consists in a certain arrangement of an endless apron in combination with the draft cylinders, as hereinafter described, at the mouth of the trunk, whereby the use of three or more of such cylinders is permitted instead of only two, which is the greatest number it has hitherto been practicable to use. The above improvements are the invention of Richard Kitson, of Lowell, Mass.

NEW PROTECTION FOR STEAM BOILERS.—Compressed hair or hogs' bristle is now being placed about the steam drums of such vessels in the navy as have their boilers exposed. Experiments prove that this substance possesses great power of resisting shot. As compared with cotton, it is far superior. A hundred pound rifle-shot was fired in the Washington Navy Yard at a bale of cotton about 80 yards from the gun; it penetrated and passed out the other side to a long distance; the same shot fired at a bale of compressed bristles, penetrated and dropped out 16 inches from the other side, showing the power of the projectile to be wholly spent. This is a patented article.

This paragraph was written before the report on this article was received from the Ordnance Department. There would seem to be some discrepancy between them.

INTERESTING AND VALUABLE REPORTS.—By favor of the Ordnance Department we have been provided with reports of recent experiments tried at the Washington navy yard, on certain targets, guns and projectiles, brought thither for inspection by officers of the Government. Two such reports will be found on page 238 of the present number. Fuller details will be found by perusing the report. We hope to make these articles, in future, a special and interesting feature of the SCIENTIFIC AMERICAN.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 22, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

40,005.—Car Brake.—A. I. Ambler, Chicago, Ill.:

I claim the screw, I, and a worm wheel, J, the latter being place on a shaft, K, working or rotating in fixed bearings, and the screw placed on a shaft, D, having a swinging or adjustable bearing, the above parts being arranged substantially as shown, and used in combination with a friction wheel, H, placed on the shaft, D, and arranged relatively with a flange, d′, of a wheel, C, of a locomotive, to operate as and for the purpose herein set forth.

I further claim, in combination with the screw, I, worm wheel, J, and friction wheel, H, arranged as shown, the spring, M, and drum, L, applied to the shaft, K, as and for the purpose specified.

40,006.—Pump.—C. C. Alexander, Denver, Colorado:

I claim the peculiar arrangement of the cylinder to a reservoir by means of the pipes; fastened to a cylinder head and to a check valve seat, substantially as hereinbefore described.

40,007.—Railroad Car Brake.—A. I. Ambler, Chicago, Ill.:

I claim, first, The frictional clutch, G, placed on the axle of the tender or engine and actuated through the medium of the levers, A F, and rod, E, in connection with the chain, I, lever, K, and bar, N, the latter being provided with the shoe, k, and all arranged as shown, to operate as and for the purpose set forth.

Second, The shaft, O, with pulley, Q, in connection with the pulley, T, on the axle, U, the pendent arm, m, with rod, P, attached and connected with the chain, E′, through the medium of the pulleys, p g, arranged as shown, or in any equivalent way, to operate as and for the purpose set forth.

Third, The connecting of the drum, R, on the shaft, O, with the pulley, Q, on said shaft, by means of a spring, S, arranged with nuts, s, substantially as shown, for the purpose of limiting the tension of the chain, u, and the power of the brakes, as set forth.

Fourth, The combination and arrangement of the clutch, G, chain, I, lever, K, chain, E′, shaft, O, with pulley, Q, attached, the pulley, T, on the axle, U, drum, R, on shaft, O, connected therewith by a clutch and spring, the chain, u, attached to drum, R, and applied to the brakes, all in the manner substantially as and for the purpose specified.

40,008.—Rotary Pump.—C. L. Adancourt, Troy, N. Y.:

I claim the arrangement of the packing pieces, C and H, with rounded stems to fit into sockets, b or j, substantially in the manner and for the purpose herein described.

I also claim the combination of the grooved flanges, d, with the sliders, F, and piston, D, substantially as and for the purpose described.

[This invention consists in the arrangement of a rounded stem on the back of the packing pieces, in combination with correspondingly rounded sockets, in the face of the stationary abutment in the cylinder and in the faces of the sliders in the rotary piston, in such a manner that the action of the water itself keeps said packing pieces tight.

40,009.—Feathering Paddle Wheel.—Alvaro Buttrick, Chelsea, Vt.:

I claim the arrangement of the spiral-faced movable self-adjusting hub, B, spindles, F, and floats, E, with the spiral clutches, H H′, cams, G, and guides, I I′, all operating in the manner herein shown and described.

[This invention relates to that class of feathering paddle wheels the floats of which are arranged to turn about axes perpendicular or nearly so, to the axis of the shaft of the wheel for the purpose of presenting the blades flatwise to the water during a portion of each revolution of the wheel, and edgewise during the remainder of the revolution. It consists in certain improved means of producing the above-mentioned feathering movement, which is operative in whichever direction the wheel rotates, and which varies the said movement to suit the reversal of the rotation of the wheel.]

40,010.—Shears and Scissors.—Joel Bryant, Brooklyn, N. Y. Ante-dated July 29, 1863:

I claim the construction and exclusive use of shears and scissors, S, figures 1 and 2, when made with curved blades, A and B, and with their rivets, R, set on a line with the curve of the said blades, A and B, substantially as herein described and for the purposes as herein set forth.

40,011.—Construction of Fly Wheels.—Joel Bryant, Brooklyn, N. Y. Ante-dated June 9, 1862:

I claim the within-described mode of using fly-wheels, W, in connection with portable or other machines, M, figures 1, 2, 4 and 6, when the said fly-wheels, W, are set to run within or beneath the base, B, of said machines, M, on anti-friction roller bearings, G, or their equivalent, substantially as herein described and for the purposes set forth.

40,012.—Monochord Tuning Instrument.—E. D. Bootman, Edmeston, N. Y.:

I claim the movable bridge bearing or stop, composed of two pieces of steel or other metal, J K, as described, in combination with the mortises, e e, in the sound board, substantially as and for the purpose herein set forth.

[The principal object of this instrument is to enable those who play the pianoforte to tune their own instruments. It is composed of a single string or monochord arranged over a sound board in a suitable case, and a bridge, bearing or stop which is movable upon the sound board to stop the string at the point to make it produce a requisite note. The improvement consists in a very simple and effective construction of the said movable bridge, bearing a stop and mode of applying the same to the sound board.]

40,013.—Joints for Tubes of Surface Condensers.—J. V. V. Booraem, Jersey City, N. J.:

I claim forming the joint between the tube and tube sheet by means of a packing, a, of india rubber or other suitable material surrounding the tube, and a hollow screwed thimble passing over the tube and screwing into the tube sheet, substantially as herein specified.

40,014.—Application of Blowers to the Furnaces of Locomotives.—F. B. Blanchard, New York City:

I claim combining the fan shaft of the blower with the driving or other wheel of the locomotive, by means of cranks, f f and d d, rods, e e, a shaft, D, gears, g g′, pinions, h h′, and clutches, i j and i′ j′, the whole applied and operating substantially as and for the purpose herein specified.

[This invention relates to the driving of the blower by gearing from the driving or other axle of the locomotive to effect combustion in a

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closed furnace; and it consists in a certain system or arrangement of gearing couplings and crank connections between the said axle and the shaft of the blower, for the purpose of driving the blower at different speeds, and affording convenience for changing the speed or throwing it out of gear whenever desired.

40,015.—Tuning Attachment for Pianofortes.—Richard Beebe, West Springfield, Mass.:

I claim, first, The combination of the monochord with the pianoforte, in such manner that the sound-board of the pianoforte constitutes the sound-board for the monochord, rendering any peculiar or separate sound-board for the monochord unnecessary, substantially as herein described.

Second, The combination with the so-applied monochord of a movable key, by which it can be struck simultaneously with any one of the strings by the action of the same hand, substantially as herein set forth.

[The object of this invention is to so far simplify the tuning of the pianoforte as to enable any person, capable of tuning unisons and octaves, to put the instrument in correct tune; and to this end it consists in the attachment of a monochord directly to the sound-board of the instrument, with the addition of such apparatus as may be necessary for bringing the monochord and the string to be tuned, simultaneously under the easy control of the hanp, thus obtaining a sufficient volume of sound without the necessity of constructing the monochord with a separate sounding apparatus of its own after the manner of the guitar and viol, as has been usual.

40,016.—Steam Boiler.—A. F. Barton, Dedham, Mass.:

I claim the improved steam generator as constructed with the smoke-flue, H, and the crescent-shaped water-vessel, F, combined and arranged with the main boiler, E, substantially in the manner and so as to operate as specified.

40,017.—Coffee and Water Cup for Soldiers.—C. L. Barritt, New York City.:

I claim, as a new article of manufacture, the use of a cup having a filterer or strainer in it, in form and principle of operation substantially as hereinbefore set forth.

40,018.—Carding Engine.—F. A. Calvert, Lowell, Mass. Patented in England in 1861:

I claim the improved carding machine as constructed with its licker-in, made substantially as described, and combined with the main card cylinder, a retainer, and mechanism by which, when rotated, such licker-in shall be made, not only to seize the fibrous material from the feeding rollers, and transfer it to, and work it, when on the retainer, but operate to continuously strip the main card cylinder at its rear, substantially as hereinbefore specified.

I also claim the combination of the toothed licker-in, one or more retainers, and machinery by which such licker-in may be driven or rotated at a velocity greater than that of the retainer or that of either of them when more than one may be employed.

40,019.—Folding Tag.—J. B. Clark, Plantsville, Conn.:

I claim the stationary folding plates, H I, in combination with the movable folding plates, F F G, the plates F, being attached to pivoted arms, C, on a sliding plate, B, and [illegible]te, G, attached to a sliding plate, G, the arms, C, being operated by the slots, d, and pins, c, when the plate, D, is moved alone, and all arranged to operate substantially as and for the purpose herein set forth.

[This invention relates to a new and improved machine for folding the ends of tags in which folded ends the meal eyelets are fitted to receive the strings which secure the tags to the articles designed to receive them.]

40,020.—Rock Drill.—Charles Courtois, Volcano, Cal.:

I claim a drill, A, having its head, b, formed square and beveling with concave sides, and the concave edge, c, about one-third the width of the face of the square, as shown and described.

Also the employment or use of the die, B, with a cavity, d, corresponding to the shape of the head, b, as described for the purpose of sharpening the drill, A.

[This invention relates to the peculiar shape of the drill and to the die which serves to sharpen the same.]

40,021.—Revolving Fire-arm.—James Maslin Cooper, Pittsburgh, Pa.:

I claim, first, The use in revolving fire-arms, susceptible of being operated by the trigger of a positive locking bolt, for locking the revolving breech, independently of the action of the trigger, at all times excepting when the cylinder is being revolved, substantially as hereinbefore described.

Second, Placing the locking bolt on the left hand side of the axis of the revolving cylinder, where the cylinder revolves from right to left (and *vice versa* where it moves in the opposite direction), for the double purpose of ensuring the entry of the head of the bolt into its recess or notch in the cylinder, and of aiding the revolution of the cylinder just before firing, so as to lock the breech before the hammer is at full cock, substantially as described.

Third, Double-locking the cylinder at the moment of firing so as to hold it perfectly rigid, by means of the hand or driver, operated by the trigger to sustain it in one direction, and the locking bolt to receive the pressure and sustain it in the opposite direction, substantially as described.

Fourth, The use of a gate attached to the recoil shield, placed at the end or throat of the hammer recess, having a narrow slot or hole of less width than a percussion cap, to allow of the passage of the point of the hammer to strike the cap, for the purpose of preventing the passage of spent caps into the hammer recess, and also to prevent the caps from projecting so far backward as to interfere with the rotation of the revolving breech, substantially as described.

Fifth, The use of a groove or grooves in the arbor or base pin of revolving breech fire-arms where such groove or grooves are parallel to the axis of the base pin, for the purpose herein before described.

Sixth, So constructing and arranging the hammer, trigger, and driver of hammer cocking revolving breech fire-arms, as that the cocking of the hammer will draw back or set the trigger, holding it in a drawn position so as to be fired by a mere touch, substantially as described and for the purposes set forth,

40,022.—Mangle.—Charles Crozat Converse, Dubuque, Iowa:

I claim the winding roller and its auxiliary apron, substantially as described, in combination with the bottom roller and endless apron, substantially as and for the purpose specified.

40,023.—Ratchet Tube Cutter.—Abel Crowfoot, Chicago, Ill. Ante-dated March 11, 1862:

I claim the combination with a common ratchet drill stock of the cutter, U, with either a square or angular shaped cutting edge, the lever, W, feed screw, T, head, Q, and extension rod, B, for the purpose of cutting off boiler flues in the manner set forth.

40,024.—Stuffing for Mattresses, Pillows, &c.—A. C. Crondal, New York City:

I claim a stuffing for mattrasses, cushions, &c., composed of ground cork and oil, made as herein shown and described.

[This invention relates to a certain process for preparing cork rubbish or waste, and to the use of the cork thus prepared for stuffing mattresses, pillows, &c.]

40,025.—Wheel Vehicle.—H. C. Drew, Oshawa, Canada West:

I claim the combination of the segment guides, J J, pivoted bar, L, and bars, j j, with the front axles and the tougue, K, in the manner herein shown and described.

[This invention relates first to an improved means employed for reducing the friction attending the running of wheel vehicles, and second, to a novel arrangement of the front wheels and draught-pole thereof, whereby the wheels in passing over obstructions which may lie in their path, are prevented from acting upon the draught-pole and moving the same laterally as hitherto, a result which greatly fatigues the team.]

40,026.—Shirt.—Abraham Drey, Baltimore, Md.:

I claim a double bosom shirt when composed of an inner bosom, d, and outer flaps or lapels, a a, substantially as and for the purposes described.

40,027.—Manufacture of Match Sticks.—S. C. Ellis, Jersey City, N. J.:

I claim the employment or use of rotary cutters, A A′, substantially such as herein specified for the purpose of producing match sticks.

[The object of this invention is to produce match sticks, the transverse section of which presents the shape of a circle, square or any other desirable form, of wood without splitting or shaving and without reference to the direction in which the grain of the wood runs, by the action of rotary cutters acting upon the wood at different points and in such a manner that by the action of said cutters the grain is crowded down in raising the shaving, and thereby the toughness of the sticks is improved and the surface of each stick is rendered even and smooth without reference to the direction in which the grain of the wood runs.]

40,028.—Instrument for taking Soundings.—John Ericsson, New York City:

I claim obtaining soundings by means of an air bag or its equivalent, loaded to touch bottom and connected by means of a tube with a register or pressure gage attached to the vessel, the pressure of air in which gage indicates the depth of water.

40,029.—Molasses Faucet.—John & Samuel Fahrney, Boonsboro, Md.:

We claim, first, The combination and arrangement of the pipe, A, cylinders, D E, valve, R, piston, F, opening, O, and valve, Q, as described.

Second, In combination therewith the stop cock, S, as described.

Third, In combination with cylinder, E, the valve, R, opening, O, piston, F, with the plug, d, the screw rod, G, and crank, K, as described.

Fourth, The combination of the piston, F, piston rod, G, cross bar, H, thumb-screw, v, and sliding rod, u, as and for the purposes described.

40,030.—Punch Block.—John D. Filkins & John M. Filkins. Johnson Township, Ind.:

We claim as a new article of manufacture, the punch block, a, in combination with the steel plate, b, the set screw, c, mortise, e, and guide, f, constructed substantially as and for the purposes set forth.

40,031.—Table Cutlery.—Joseph W. Gardner, Shelburne Falls, Mass.:

I claim as an improvement in table cutlery a knife or fork having its handle or bolster made and applied together in manner substantially as herein before described and as represented in the accompanying engravings.

40,032.—Oil Cup for Machinery.—Thomas W. Godwin, Portsmouth, Va.:

I claim, first, The arrangement with an oil cup, of the valve, L, or its equivalent, the valve stem, G, and the cup, N, as shown and described.

Second, The arrangement within an oil cup, of the stems G and G, and their valves, when constructed and operated substantially as shown and described.

40,033.—Air Heating Furnace.—William H. Harris, Grand Rapids, Mich.:

I claim the arrangement and combination of the curved tubes, B, forming the fire grate of the furnace, cold air passages, E, air heating chamber, F, drum, H, provided with the tubes, J, and the furnace, A, as herein fully shown and described.

[The object of this invention is to obtain an air-heating furnace which will admit of the air having a direct or unbroken passage through the air-heating chamber, and at the same time be brought in contact in its passage through said chamber, with a large area of heating surface.]

40,034.—Machine for Shearing Iron.—Anson Hardy, Boston, Mass.:

I claim, first, So attaching the rotary knife to the carriage which carries it, that without raising or lowering said carriage, said rotary knife may be raised or lowered, for the purpose of increasing or diminishing the distance between the stationary straight knife and the said rotary knife, in the manner substantially as herein described.

Second, I claim the combination of wrough-iron trusses, in the manner substantially as herein shown, with the upper and lower beams and side pieces and the rotary knife of the machine for the purpose of adding rigidity to said upper and lower beams and side pieces, and also for the further purpose of causing said machine to do its work with a less expenditure of power, and with very much less risk of breaking said rotary knife.

Third, I claim suspending the knife carriage to the lower side of the upper beam and bracing it laterally against the rear side piece below the lower side of the carriage, in the manner substantially as herein described, so as to obtain a much greater distance than has ever before been obtained, between the upper and lower beams, for the purpose of enabling the workman conveniently to secure the sheet of metal to be cut, in the exact position desired, between the knives, and for the purpose of enabling said workman to see distinctly if said sheet of metal is accurately placed.

40,035.—Black-board and Map-case.—Wm. C. Herider, Miame Town, Ohio:

I claim a combined black-board and map case, substantially as herein shown and described.

[This invention consists in the employment or use of a case constructed of rectangular form and having a door at its front side, which may comprise one half the length of the front of the case, the door being hung upon hinges or arranged so as to slide, and the whole of the front of the case being painted black so as to serve as a blackboard, while the interior of the case at its top and bottom is provided with guides or grooves in which frames or slides are fitted and on which maps are secured, the frames being equal in light to the interior of the case, and equal in length to one half the length of the case; all being so arranged that when the device is not used as a black-board, the door may be opened and any one of the frames or slides shoved back into the part of the case at one side of the door so that any one of the maps in the open part of the case may be exposed.]

40,036.—Shingling Hipped Roofs.—Asahel R. Holcomb, Naples, N. Y.:

I claim substituting for the ordinary small triangular pieces that complete the courses at the hip, the joint shingles, b′ c′ d′, each projecting to the base line of the course already laid, arranged so as to be securely nailed and held in place without splitting or warping, and without the necessity of weather boards, and furnishing an extra thickness of covering, substantially as herein set forth.

40,037.—Coffee Roaster.—Samuel Hoyt, New York City:

I claim, first, The hollow shaft, B, in combination with a roasting drum, the shaft serving to bear and to drive the roasting drum, A, and being provided with apertures, k k, in its circumference, and outlets at one or both ends to conduct off the gases from the interior of the drum either into an aromatizing chamber, G, or off into the chimney, substantially as described.

Second, Making a part of the frame within which a coffee roaster is arranged of tubes, d d, which are slotted or punctured in such manner that they constitute fluid or gas burners, substantially as and for the purposes described.

Third, The combination with an aromatizing chamber, G, of a roasting drum, A, the same communicating with each other by means of a hollow shaft or equivalent device, substantially as and for the purposes described.

Fourth, The combination of a corrugated cylindrical drum and a series of gas or fluid burners, which constitute the ties or longitudinal parts of the frame in which the drum is arranged, substantially as and for the purposes described.

Fifth, A cylindrical corrugated tight roasting drum composed of one continuous piece of corrugated metal and two plates or heads which are scolloped around their edges or circumferences, as and for the purpose described in combination with an axial shaft as set forth.

40,038.—Beehive.—Alexander Hogg, Rutland, Ohio:

I claim a beehive composed of a rectangular box or case, A, provided with a slatted bottom, E, and with vertical partitions, g g, and horizontal partitions, h i, all arranged as shown, to form compartments to receive drawers, B C D D′, the drawers, B, being at the sides of the drawers, D D′, and the drawers, C, above the latter, a communication being formed between the drawers, D D′, and B C, as shown, and the drawers, D D′, being constructed and arranged as shown so as to form the body or main part of the hive, and still either of the drawers rendered capable of removal, for the purpose specified.

[The object of this invention is to obtain a beehive which will be proof against the intrusion of the bee-moth, and which will afford great facilities for applying slide drawers to the main hive and removing them therefrom, and which will also afford great facilities for forming new colonies from the parent hive without allowing the bees to swarm, the invention at the same time admitting of the spare honey being readily removed from the drawers and also admit of the combs in the main hive being rendered very accessible in case their removal is required.

40,039.—Machinery for finishing Rim-bases of Ordnance.—E. F. Howard, Boston, Mass.:

I claim finishing or cutting the rim-bases of ordnance, by the employment of a cutting tool, guided automatically by a pattern, cam, rotating and feeding mechanism, substantially as described.

I also claim giving to the pattern, L, the reverse movement in the manner and for the purpose as set forth.

40,040.—Rubber Attachment for Wash-boards.—John Hull, Vienna, N. J.:

I claim attaching the rubber, B, by means of the joints, d d, on its upper surface to the wash-board, A, by means of the jointed or flexible frame formed of the rods, e e, shaft, f and arms, h, when the frame is pivoted or jointed to the lower end of the wash-board as herein shown and described.

40,041.—War Rocket.—J. B. Hyde, Newark, N. J. Antedated April, 25, 1863:

I claim the construction of a rocket case with the ring, a, combined with the apertures, c c, and core, E, by means of the channel, d, or their equivalent, substantially as described.

Second, I claim the radial adjustable fuse, f, arranged as described for igniting the contents of the shell directly or through the agency of the inner fuse, e, as described.

Third, I claim the hood match, p, and its protector, r, secured and ignited as described, and

Fourth, I claim the partially guarded match, h, with its branches for simultaneously igniting the rocket and shell fuse as described.

40,042.—Press for Charging Rockets.—J. B. Hyde, Newark, N. J. Ante-dated April 22, 1863:

I claim employing one of the bars or ties of the frame work of a condensing press as the axle or journal for a rotating working table or platten for supporting or carrying the work to be acted upon by the press, and arranged in the manner and for the purpose specified.

40,043.—Machine for Crushing Sugar and forming it into Blocks.—G. A. Jasper, Charlestown, Mass.:

I claim the above-described improved sugar-crushing and blocking machine, having its parts arranged and constructed substantially in manner and to operate as specified.

40,044.—Faucet and Vent.—Jacob Jahraus, Buffalo, N. Y.:

I claim the compound discharge nozzle composed of the cylinders, G and H, in combination with the hollow valve piston, K (with or without the holes, K′,) valve-stem, C, and valve, c1 c2, and lever, E, arranged and operating for the purposes and substantially as described.

I also claim the valve, P, arranged and operating upon the outside of the ventilating plug, M′, substantially as set forth.

40,045.—Roller Attachment for Breast Straps.—F. Jones, Prescott, Wis.:

I claim the frame, A, provided with the roller, B, and the hook, b, when applied to the neck yoke and breast straps, substantially as and for the purpose specified.

[The object of this invention is to obtain a simple means to prevent horses in double harness being shoulder-jammed, and also prevent the friction and rubbing on the shoulders of the horses caused by the lateral motion of the ordinary breast straps, as well as to prevent the wear of the breast straps caused by the rubbing of the same through the rings which connect them to the neck yokes.]

40,046.—Water Elevator.—W. D. Jones, Hagaman's Mills, N. Y.:

I claim the peculiar arrangement of the several parts of the described friction clutch and crank combined, in combination with the pawl, g, shaft, a, and crank, handle or lever, d, constructed and operating substantially as and for the purposes shown and described.

40,047.—Haversack.—Thomas Kech, New York City:

I claim a haversack formed of pervious material and having a detachable or impenetrable side-piece, the whole arranged to operate substantially as described for the purposes set forth.

40,048.—Brakes to Cotton Lappers.—Richard Kitson, Lowell, Mass.:

I claim so combining the brake with the shipper that it is brought into action when the operation of the machine commences, and is thrown out of operation when the operation of the machine ceases, substantially as herein described.

40,049.—Machine for Preparing Cotton and other Fibrous Material for Carding.—Richard Kitson, Lowell, Mass.:

I claim the arrangement of the endless apron, G, and draft cylinder or screws in combination with each other and in relation to the mouth of the trunk and to the lap-head substantially as herein specified, whereby several sheets of fiber delivered from the cylinders or screens are united and delivered in a united state to the lap-head.

40,050.—Lamp Burner.—C. H. Kupfer, Hoboken, N. J.:

I claim, first, The arrangement, within a burner, of a fluted cone, F, constructed and operating substantially as set forth.

Second, The deflecting cap, G, when provided with a contraction, h, at about half way of its height, but whether with or without the perforations, m m, the whole constructed and operating substantially as described.

Third, The combination with said fluted cone, F, of the perforations, b b, operating as specified.

Fourth, The combination of the fluted cone, F, the cap, G, contracted as described, and the perforations, b b, the whole constructed and operating as above-mentioned.

Fifth, The arrangement set forth for attaching the cap G, to the body, A, of the burner, so as to form an air-space, q, to diminish the conduction of heat to the oil reservoir.

40,051.—Removing Spikes from Guns.—Augustus Lafever, Battle Creek, Mich.:

I claim, first, The mode herein-described of unspiking guns by means of an annular bit in combination with the adjustable frame, A, substantially as described.

Second, The adjustable frame, A, constructed and operating substantially as described.

Third, The self-adjusting socket, C, in combination with the adjustable plate, B.

40,052.—Corn Sheller.—C. J. Legg, Penn Yann, N. Y.:

I claim the shelling and husking cylinder, A, constructed with hinged radially-vibrating staves, B B, controlled by springs, a a, and with teeth arranged spirally both upon the staves and intermediate portions of the cylinder, substantially as herein specified.

I also claim the combined construction and arrangement of the fixed staves, c c, and hinged radially-vibrating staves, D D, controlled by springs, H H, together composing the concave to the shelling cylinder, substantially as herein set forth.

40,053.—Apparatus for Ornamenting Gum Jewelry, &c.—Norman Lanphear, Monmouth, Ill.:

I claim the forming of letters or other devices in or upon the surface of articles of gutta percha, india-rubber or other gum, by the use of the clamping tool, A, anvil, a, die stock, b, and set screw, c, all constructed, combined and arranged as herein shown and described, so as to be adapted for use by heating that portion only of the tool which presses or forces the dies or devices into the gum.

[This invention consists in the application of a heated instrument to letters or other ornaments to be inserted in gutta percha, india-rubber or other gums, in such a manner that by a moderate pressure, combined with the heat, the set is forced in to its desired

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depth, and, by suddenly cooling the instrument and gum while the pressure is still maintained, the expansion of the gum in cooling is prevented and the letter or other ornament is firmly retained.]

40,054.—Explosive Shell.—Wm. Maginn, New York City:

I claim the ring, C, and attached hammer, b, applied to operate within a double groove, d d′, in combination with a nipple, c, and fuse hole, g, substantially as and for the purpose herein specified.

[This invention consists in certain means of exploding a percussion cap, by the rotary motion of a projectile in a rifled piece of ordnance, for the purpose of igniting a time fuse. It also consists in a certain construction of an explosive projectile for the purpose of providing for the effective scattering of bullets or the missiles without exploding the body of the projectile, which acts like a solid shot.]

40,055.—Apparatus for applying Metal Leaf to Moldings, &c.—R. J. Marcher, New York City:

I claim, first, The employment or use of the tip or brush, I, attached to an arm, H, and arranged with or without a spring, a*, or with the equivalent of a spring, to operate substantially as and for the purpose herein set forth.

Second, The endless apron L, in combination with the arm, H, tip or brush, I, and slide, G, arranged for joint operation as and for the purpose specified.

Third, The combination of the endless apron, L, slide, G, arm, H, tip or brush, I, and the sliding bar, B, which supports the molding, C, actuated from the slide, G, through the medium of the pawl, E, lever, F, and the rack in the bar, B, substantially as and for the purpose set forth.

40,056.—Bed for Invalids.—J. N. Morrison, Philadelphia, Pa.:

I claim, first, the combination of the jointed leg-rests, E E, and jointed supporting bars, F F G G, when the said parts are constructed and arranged to operate in the manner and for the purposes herein specified.

Second, The carriage, H, constructed and operated substantially as set forth, to place either the pad, L, or pan, M, beneath the aperture a, in the bed.

Third, The elevating lever, P P, and retaining ratchet, R, or equivalent devices, operating in any manner substantially as described, to raise the pad or pan and retain it in the aperture, a.

Fourth, The air-tight cover, T, employed in the described combination with the carriage, H, to close the pan, M, when not in use.

Fifth, The combination of the removable swiveled standard, W, swivel, V, and clamp screws or nuts, u v, for securing the desk or table, U, in any required position.

40,057.—Lantern.—William Mullins, Steubenville, Ohio:

I claim surmounting the oil cup with a hot-air chamber, and supplying heat thereto by means of the bent tube, D, passing over the flame of the lamp from a point below the bottom of the oil cup, and discharging into the air chamber in the manner and for the purpose specified.

40,058.—Device for Supplying Gas Retorts with Liquids.—E. L. Norfolk, Salem, Mass.:

I claim maintaining a regular supply of hydro-carbon for gas purposes by means of the chamber, A, and connecting pipes, E and F, or their equivalents, the whole operating in the manner and for the purpose set forth.

40,059.—Cross-cut Sawing Machine.—G. D. Pearson, Ypsilanti, Mich.:

I claim the combination of the working bar, G, saw, K, and guide block, J, with the circular guide posts, b b, and the mode of raising and lowering the saw by means of the crank shaft, N, and the manner of attaching the machine to the log, arranged and operated in the manner and for the purpose herein explained.

40,060.—Smut Mill.—Dan Pease, Floyd, N. Y.:

I claim a stationary hollow cylinder for a smut machine composed of small cast-iron pieces, constructed, combined and connected as herein described, and for the purposes described.

I also claim separately the construction of the cast iron pieces of which the said cylinder is composed, in such manner and form as that the internal trenches alternate with the intervening ridges as herein described, and for the purposes described.

I also claim the clearers, x, on the top covering of the revolving cylinder, constructed and arranged as described and for the purposes described, the whole being constructed, combined and arranged substantially in the manner herein set forth.

40,061.—Coal Hod.—Jesse Pilbeam, Seneca Falls, N. Y.:

I claim the ring, C, constructed as described in combination with the receptacle, A, and base, B, arranged and operating substantially as herein set forth.

40,062.—Pump.—F. D. Prudhomme, Paris, France:

I claim, first, The combination of two pumps, one being a lift and the other a force pump, arranged as herein shown, or in any equivalent way, to operate conjointly in the manner as and for the purpose specified.

Second, The particular construction of the lift pump as herein described, to wit: two solid pistons of equal size fitted in a cylinder divided into two compartments by a fixed partition, forming a resisting surface to the action of the water as described.

Third, The combination of the cylinders, M A A′, pistons, P B B′, pipes, F′ J J′, and valves, D D′ d d′ L L′, all arranged and operating substantially as set forth,

Fourth, The described arrangement and combination of parts constituting the double acting driving pump without valves, but with a solid piston transmitting motion to the lift pump pistons through continuous columns of water, whereby the use of a rod extending down the well, mine-pit or shaft, is dispensed with.

[My invention relates to the construction of machinery or apparatus or raising water, by means of which water may be lifted from considerable depths in an uninterrupted or unbroken stream.]

40,063.—Machine for Breaking and Cleaning Hemp, Flax, &c.—Gelston Sanford, Great Britain, and James E. Mallory, New York City:

We claim the pair of toothed rollers, one of which has a longitudinal reciprocating motion as well as a rotary motion, in combination with fluted rollers, having a continuous rotary motion, substantially as described and for the purpose set forth.

40,064.—Hay and Cotton Press.—Wilbur Read, Greenwood, Cal. Ante-dated Oct. 17, 1862:

I claim the combining with the drums, G G′, arranged as described, the loose shaft, g, with its lever, H, spur wheel, h, with its toothed hub, i, spur wheel, j, sliding plate, k, levers, m and p, all arranged substantially as set forth, and causing the drums, G G′, to operate upon their respective ropes, c and s t, as herein specified.

[This invention relates to an improvement in applying power to a cotton or flax press. The object of the invention is to communicate the required alternate pressures and releasing movement to the follower of a cotton press, from the continued circular motion of a common sweep or lever to which a horse is attached, or to stop the movement of the follower at pleasure, while the horse continues to walk in a circle.]

40,065.—Boys Sleds.—N. C. Sanford, Meriden, Conn.:

I claim, first, Attaching the rudder, D, to the rear end of the seat, B, between the runners, C, in the manner and for the purpose shown and described.

Second, The application of the flanges, f, and rib, g, in combination with the runner, C, and rudder, D, constructed and operating in the manner and for the purpose substantially as specified.

[The object of this invention is to facilitate the operation of steering a sled in "coasting" or going down a steep hill, and to enable every boy or child to slide down sitting comfortably in an upright position, legs and feet all aboard and guiding his vehicle by the motion of his feet, or by pulling a cord in the easiest and simplest manner.]

40,066.—Distance Indicator for Railroads.—S. O. Schoonmaker, Wright, N. Y.:

I claim the double incline plane or lifter, M, together with the arrangement of the striker, K, spring, L, lever, G, and vertical rod, E, and catch, D, when used in combination with the distance indicator, substantially as and for the purpose specified.

40,067.—Operating Ordnance.—M. W. Wappich, Sacramento, Cal.:

I claim, first, Elevating and depressing guns by their trunnions, by means substantially as and for the purposes described.

Second, Providing a gun carriage which is constructed of cheeks, C C, lateral braces, arranged above and below a gun which oscillates on, and is elevated and depressed by, its trunnions, substantially as described.

Third, So constructing a gun carriage and mounting a gun (which swings on its trunnions) therein, that while the gun can be raised or depressed and the carriage remain stationary, the trunnions will have a rigid and firm support, substantially as described.

Fourth, The application of compressing jaws, F F, to a gun carriage in such manner that they will operate simultaneously upon the lower surfaces of the flanches of the chassis, and press upwards or in direct opposition to the gravity of the carriage, substantially as described.

Fifth, Adapting the slow cams, s s, to operate in conjunction with the loose collars, g g, on the axle, P, for the purpose of throwing the gun carriage upon its truck wheels, substantially as described.

40,068.—Deodorizing Petroleum, Naphtha, &c.—R. N. Warfield, Rochester, N. Y.:

I claim deodorizing petroleum, naphtha, &c., by the introduction of a volume of steam into the liquid beneath its surface, by means of the pipe, C, and drum, B, or in an equivalent manner, so that the steam is distributed throughout the contents, and removes the gas by its passage through the oil, substantially as herein set forth.

I also claim passing the steam through the box, E, or its equivalent, containing chloride of lime, muriate of ammonia and stone lime, so that the steam becomes impregnated with the principles of those elements prior to entering the oil, for the purpose of further purification, substantially as specified.

40,069.—Rolling Leather.—Joel Whitney, Winchester, Mass.:

I claim first, The arrangement of the geared screws, a a, and the geared actuating shaft, with the rollers, V V′, and springs t2 t2, so that the lower as well as the upper roller is adjustable, substantially as set forth.

Second, I claim combining the rollers, V V′, with an actuating shaft and bevel wheels located below the lower roller, by means of which power may be applied to the rollers through the rotation of such shaft and wheels, and by a lever power additional thereto, all from a point below the lower roller substantially as and for the purpose described.

Third, In combination with pressure rollers, V V′, to which power may be applied from a point below the lower roller, either solely by an actuating shaft and bevel wheels, or, in conjunction with a lever power additional thereto, I claim the application of rubber springs, t2 t2, and the pendent ratchet, h, substantially as and for the purpose described.

Fourth, I claim the combination of the parts, a and p′, by means of the bracket, Q, as and for the purpose set forth.

40,070.—Gun and Blasting Powder.—G. B. Wiestling, Oxford Furnace, N. J. Ante-dated Dec. 3, 1862:

I claim the manufacture of gun and blasting powder of charcoal, sulphur, nitrate of soda and chlorate of potassa, either with or without nitrate of potassa, by the process herein specified.

40,071.—Surgical Splint.—Charles Wittmann, M. D., Brooklyn, N. Y.:

I claim, first, A perforated sheet-metal splint made in the manner and for the purposes substantially as herein shown and described.

Second, The application of the buckles, c′ g, and eyes, e e, with or without springs, i, in combination with the two parts, A′ A″, of a splint as described, for the purpose of effecting an elastic or unelastic extension and counter-extension to the limb.

Third, The double-hinged serrated bar, B, with the adjustable spring catch, j, in combination with the splint, A′ A″, constructed and operating in the manner and for the purpose substantially as shown and described.

Fourth, The adjustable pivot, h, in combination with the rods, a* d, carrying the parts, A′ A″, as described for the purpose of accommodating the joint of the splint to the axis of the joint of the limb to be treated.

Fifth, The application of the screws, 11′, with hinges, 1*, 1′*, to the foot-plate, A‴, as and for the purpose specified.

Sixth, The arrangement of the springs, n, in combination with the foot-plate, A‴, constructed and operated in the manner and for the purpose substantially as set forth.

40,072.—Quartz Crusher.—James D. Whelpley, Boston, Mass.:

I claim, first, Revolving the radial cutters, L, or their equivalents, close to the bottom and side of a suitable tub or cylinder, and causing the material which is to be broken, to fall by its own weight upon said cutters, whereby while falling in a free and open space, and held by inertia alone, it is effectually broken or shivered to pieces, substantially as described.

Second, In combination with the horizontally revolving cutters, L, the grate or perforations, N, in the periphery of the tub, substantially as and for the purpose described.

40,073.—Stove.—Wiley S. Wright, St. Louis, Mo.:

I claim, first, Supporting the inner end of sliding stove doors upon the top edge of the lower part of the door frame, by means of hooks which are applied to and move with doors, substantially as described.

Second, The outside auxiliary supports, e e, in combination with hooks, c c, arranged on the inside of the doors, substantially as and for the purposes described.

Third, In combination with the inner hooks and outer supports I claim the overhanging strip, b, applied to the door frame, substantially as and for the purposes described.

40,074.—Hand Stamp.—Victor Beaumont, New York City:

I claim, first, The combination in one instrument of a hand stamp with an inking pad, under an arrangement substantially as hereinbefore described, so that the stamp shall be inked automatically without the use of inking rollers, substantially as herein set forth.

Second, The method of connecting the inking pad with the head or knob of the stamp, by means of articulated pendant rods in combination with guides or their equivalent, for giving to the pad when actuated by the knob the requisite motion for clearing the path of the stamp, substantially as herein set forth.

Third, Combining with the stamp and inking pad a frame so arranged as to constitute the means for firmly holding the paper; for supporting the instrument and for properly guiding the pad and stamp in their various movements during the operation of the instrument, substantially as herein described.

Fourth, The employment in combination with a knob and inking pad united as herein before referred to, of a shank tube and extension spring for holding the pad against the stamp when the instrument is not in use, and for maintaining the stamp ready inked before a downward motion is imparted to it, substantially as herein described.

Fifth, The combination with a knob sliding upon the shank of a helical spring, located within the knob and around the shank and between reverse flanges applied to the knob and shank respectively, in the manner and for the purposes substantially as herein described.

Sixth, Combining the head or knob of a hand stamp operated by pressure applied to the head, with the inking pad, so that the said pad is brought out of contact with the stamp, before the stamp itself partakes of the movement imparted to the head, substantially as set forth.

Seventh, Enlarging the guide slots in or about the plane in which the pad rests in contact with the stamp, so as to allow a sufficient play of the pad for the occasional renewal of surfaces of contact, substantially as herein shown and described.

40,075.—Mode of directing Motion.—Andrew Buchanan, Jersey City, N. J., assignor to himself and Wm. A. Righter, Newark, N. J.:

I claim the oscillating and longitudinally moving arms, C, slide, F, and stationary-arc formed or curved guide, f f′, the whole applied in combination with each other and with the body whose motion is to be directed, substantially as and for the purpose herein specified,

40,076.—Mold for Casting Printing Types.—R. W. & D. Davis (assignors to themselves, Daniel Appleton & Co., John Perkins & Nehemiah P. Stanton), New York City:

We claim, first, The construction of the mold in parts of a series of strips, g g h h, fitted loosely to and combined by a flexible and elastic connecting piece, F, substantially as and for the purpose herein specified.

Second, The combination of the tenons or projections, j j, on each or any number of the strips, g g, and corresponding mortises or recesses in the matrix block or matrix strip, substantially as and for the purpose herein specified.

Third, The mold slide, D, receiver, G, plunger, G′, and cut-off, H, the whole applied in combination with each other; and with the box, A, and cover, B, substantially as and for the purpose herein specified.

40,077.—Lock.—Randolph S. Foster (assignor to himself, C. Walsh & J. C. Nobles), Sing Sing, N. Y.:

I claim in combination with a double-bitted key, G, the cam-wheel, F, tumblers, E, and bolt, C, constructed and operating together in the manner and for the purpose herein described and represented.

40,078.—Grinding Mill.—S. S. Howard (assignor to Edgar D. Gillis), Milton, N. Y.:

I claim, first, The arrangement of the feed-regulating plates, K K, between the cap, J, and the plate, L, substantially as and for the purpose herein shown and described.

Second, The annular plate, L, provided with the ears, O O, in connection with the pendant rods, p p, attached to the hopper, M, and passing through the ears or lugs, O O, for the purpose of securing the hopper to the mill and rendering the plate, K, accessible for adjustment.

[This invention relates to certain improvements in that class of grinding mills which are portable and designed for domestic purposes, such, for instance, as grinding feed for stock. The invention consists in constructing and arranging certain parts of the mill in such a manner that it may be furnished at a much less cost than those of a similar kind hitherto constructed.]

40,079.—Machine for Oiling Tanner's Leather.—George Huttelmaier (assignor to himself and Henry P. Mueller), Allegheny, Pa.:

I claim the process of subjecting tanned hides to friction in a close heated cylinder or other vessel, so constructed as to retain its heat for a considerable time, and containing melted grease for the purpose of greasing them, substantially as hereinbefore described.

40,080.—Coil Oil Lamp.—A. C. Ketchum (assignor to Wm. P. Pettingill & S. T. McDougall), New York City:

I claim, first, The application of the partition or cross-bar, E, to the tube, B, and base, a.

Second, I claim the peculiar mode of attaching the jacket, D, as shown in Fig. 1.

Third, I claim the combination of the jacket, D, with the partition, E, and attached to the tube and base, B and A, substantially as described, thereby making a simple and economical burner.

40,081.—Printer's Quoins.—Hippolyte A. Marinoni & Francois Noel Chandré (assignors to Richard March Hoe), Paris, France:

We claim the combination of toothed or cogged roller quoins and furniture having corresponding racks, teeth, or cogs, substantially as herein described.

40,082.—Apparatus for attaching Pumps to Bungs of Barrels.—Francis A. Pratt (assignor to Pratt, Whitney & Co.), Hartford, Conn.:

I claim the employment in combination with the suction pipe of a portable pump, of a crab, or saddle, C, a hooked bolt, b, and a clamp screw, h, or their respective equivalents, combined, arranged, and operating to secure a barrel pump to a barrel, substantially in the manner hereinbefore described.

40,083.—Method of Utilizing Exhaust Steam.—Treat T. Prosser (assignor to himself and M. C. & K. A. Darling), Fond du Lac, Wis.:

I claim, first, Applying the exhaust steam of a steam engine under pressure greater than that of the atmosphere to a boiler or boilers, or any part thereof, whether the boiler or boilers be used separately or in combination with the boiler or boilers, either exclusively for the purpose of generating steam in the boiler or boilers or for aiding the fire to generate it.

Second, The valve, f, or its equivalent in combination with the diaphragm, c, and exhaust steam tubes or flues, with or without a steam chamber around the boiler for regulating the pressure to be given the exhaust steam.

Third, The chamber, K (Fig. 7 and 21 and cross section Fig. 14), constructed and arranged in the manner and for the purpose set forth.

40,084.—Tucking Device for Sewing Machines.—Israel M. Rose (assignor to J. Wilcox), New York City:

I claim, first, The mechanism herein described to be used as an attachment to sewing machines for marking tucks, said mechanism being constructed and arranged so that when actuated by the needle arm or other moving parts of the sewing machine it shall form a well defined ridge on the face of the cloth opposite that in contact with the table, substantially in the manner hereinafter shown and described.

Second, As the sewing machine attachment, I claim the device or mechanism for marking tucks, said mechanism consisting of jaws arranged in pairs closing and opening at regular intervals to seize and release the cloth, in the manner and for the purposes herein set forth.

Third, So combining the parts of a sewing machine attachment for marking tucks for action substantially as set forth, as that the jaws are brought down in contact with, to impinge upon the cloth while yet open, and are closed by the resistance then offered to the further descent of the jaws, substantially as herein shown and described.

Fourth, Combining with the jaws acting substantially as herein before described a metal strip arranged in line parallel with the feed and operating in conjunction with the jaws, substantially in the manner and for the purposes set forth.

40,085.—Gas Compensator.—Addison Smith (assignor to himself and James M. Sayre), New York City:

I claim, first, Combining with a cylinder provided with ports and a valve mechanism substantially as described, the inverted cup and fluid joint for operating the valves and regulating the pressure of gas, substantially as described and set forth.

Second, The combination with an inverted cup and fluid joint of a double valve, whereby a small movement of the inverted cup causes the valve to give increased communication between the pipes, and thereby more quickly and evenly regulates the pressure of gas, substantially as described and set forth.

40,086.—Pawl and Ratchet.—George G. Taylor, Worcester, Mass., assignor to A. Brown & L. G. Kniffen, Worcester Mass., and Thos. H. Dodge, Nashua, N. H.:

I claim, first, The circular pawl supporting socket, D, in combination with the rear end of the pawl, a′, substantially as shown and described.

Second, The combination of the pawl, a′, socket, D, flange, A′, and spring, S, when constructed and arranged to operate in relation to each other and the ratchet teeth, b b, as shown and described.

Third, I also claim the combination of the internal flange or hub, B′, with the parts, B and A, as and for the purposes set forth.

40,087.—Felting Machine.—Enoch Waite, Lawrence, Mass., assignor through mesne assignments to the Berkeley Manufacturing Company:

I claim a combination of a picker, a perforated cylinder, F, or its equivalent and machinery for felting, the whole being arranged and so as to co-operate substantially as described.

I also claim a machine or combination, composed not only of machinery for making felt, but of a mechanism or apparatus for applying paste or cement to a sheet of paper or the equivalent thereof, when applied to make felt in manner and under circumstances substantially as described.

I also claim the combination composed of felting mechanism, a pasting apparatus, a perforated or woven wire cylinder, F, and a picker, the whole being made and arranged so as to co-operate substantially as specified.

I also claim the combination of one or more stripping bobbins, R R, or the equivalent thereof and suitable supporting devices therefor with the machinery, substantially as described, for producing felt fabric.

I also claim in combination with the felting mechanism a means of heating one or more of its platens, whereby they may be rendered capable of drying and smoothing the felted fabric, or the same and the paper to which it may be connected.

RE-ISSUES.

1,541.—Clap-board Joint.—William Baker, Utica, N. Y. Patented May 16, 1854:

I claim, first, The construction of the joint of clap-boards or jointed siding for houses and other buildings in such manner that the boards when laid on the frame, shall lie flat and solid for their whole width against the frame of the building; and at the same time shall preserve the appearance and advantage of clap-boarding in front, by the outer lip of the upper board at each joint overlapping outside the board next below it for shedding the water, as described.

Second, I claim the combination of the lock, a, in the rear of the joint, for holding the board to the frame at the lower edge as described, with the extended lip, C, Fig. 1, in front for covering the

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head of the nail as described. The whole being constructed, combined, and arranged, substantially in the manner and for the purposes herein set forth.

1,542.—Sugar Mold Carriage.—Theo. A. Havemeyer (assignee of T. A. Havemeyer & Henry Snitzpan), New York City. Patented March 18, 1862:

I claim, first, The adjustable plates, G H, provided with arms, f f', and arranged or applied to the carriage, substantially as and for the purpose set forth.

Second. In combination with the adjustable plates, G H, the frame, A, provided with recesses, k, to receive the tips, l, of the molds as specified.

Third, Providing the frame, A, with a recess, e, and its front part or end, substantially as shown, to receive the caster wheel, C, when said frame, recess and caster wheel are used in combination with or applied to a sugar mold carriage, for the purpose herein specified.

Fourth, The hollow post, E, arranged to receive the arbor. c, of the caster wheel, C, and attached to the frame, A, to support the front end of the plates, G H, substantially as set forth.

Fifth, The combination, construction, and arrangement of the parts herein shown and described, to operate as and for the purpose specified.

[This invention relates to an improved carriage for conveying sugar molds from the coolers in the refinery, to the apartment in which they are placed to admit of the draining operation being gone through with. The object of the invention is to obtain a carriage for the purpose specified which will admit of being adjusted to suit molds of different sizes and also be capable of being moved about with greater facility than those previously constructed.]

1,543.—Sewing Machine.—John Batchelder, Lisbon, Conn. Patented May 8, 1849. Extended May 8, 1863:

I claim, first, In combination the holding surface which supports the material immediately about the needle horizontally under the thrust of the needle, and the continuous discharging feed which moves the material horizontally under and past the needle upon and over such holding surface, each having the functions and mode of operation hereinbefore specified.

Second, I claim in combination the holding surface which supports the material immediately about the needle horizontally under the thrust of the needle, the continuous discharging feed which moves the material horizontally under and past the needle upon and over such holding surface, and the receiving and supporting or discharging plate which receives the material from the feed and insures its free passage from the feed and machine during the operation of the machine in sewing a seam, each having the functions and mode of operation hereinbefore specified.

Third, I claim in combination the horizontally holding surface immediately about the needle, the continuous discharging feed, the receiving and supporting or discharging plate and the yielding pressure holder, each having the functions and mode of operation herein before specified.

Fourth, I claim in combination the horizontally holding surface immediately about the needle, the continuous discharging feed, and the yielding pressure holder, each having the functions and mode of operation herein before specified.

Fifth, I claim in combination the horizontally holding surface immediately about the needle, the continuous discharging feed, the yielding pressure holder, and a sewing mechanism, each having the functions and mode of operation herein before specified.

Sixth, I claim in combination the horizontally holding surface immediately about the needle, the continuous discharging feed, the yielding pressure holder, and the reciprocating eye-pointed needle, each having the functions and mode of operation herein before specified.

Seventh, I claim in combination the receiving and supporting or discharging plate, and the continuous discharging feed, each having the functions and mode of operation herein before specified.

Eighth, I claim in combination the horizontally holding surface immediately about the needle, the continuous discharging feed and the reciprocating eye-pointed needle, each having the functions and mode of operation as herein before specified.

Ninth, I claim in combination the continuous discharging feed, the receiving and supporting or discharging plate, and the yielding pressure holder, each having the functions and mode of operation herein before specified.

DESIGN.

1,819.—Stove.—Garrettson Smith & Henry Brown, Philadelphia, Pa., assignors to H. C. March & E. Sisler, Lawrenceville, Pa.:

NOTE.—The total number of patents recorded above is eighty-six, THIRTY-FOUR of these were solicited through the Scientific American Patent Agency.

IMPORTANT TO INVENTORS,

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or rawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fe f $5, accompanied with a model of drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical productions he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

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We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, whereany questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

Notes and Queries

T. H. S., of Conn.—If you read the advertising pages of the SCIENTIFIC AMERICAN you will find the article you desire. A long list of such substances was printed in this journal some five weeks ago. Read your paper more carefully.

E. A. H., of Ill.—You are probably aware that your article was printed from your own copy. If there are obscurities in it you are responsible—not we.

J. R. H., of Pa.—An assignment for a patent must have a five cent revenue stamp attached, and to a power of attorney there must be attached a $1 stamp.

F. A. M., of N. Y.—We regret that we are unable to publish your article on "Storms" The subject is of limited interest. Your M. S. S. is subject to your order.

E. J., of N. H.—The plates of iron steamers are made water-tight in the same way that steam boilers are: they are riveted and the edges of the plates are afterwards calked with a calking tool. The plates are sometimes lapped and sometimes riveted to an inner sheet, on which two plates are laid; thus giving a flush surface outside. Armor plates are not calked to prevent leakage; they are not generally tongued and grooved although this plan has been used.

E. W., of N. Y.—It is not true that heat as an action of matter is a new theory, but it has only been fully demonstrated within a few years. Some ancient writers on philosophy considered heat to be an action or motion of matter.

C. N. B., of Pa.—There is no single work published on the carding, dyeing and finishing of woolen fabrics.

H. T., of Pa.—Measures have been taken, we believe, to lay another Atlantic telegraph cable in the summer of 1864. The cable is now being manufactured by Glass, Elliott & Co., of London, who have also undertaken to lay it.

J. C. S., of N. H.—Cinnabar is the sulphuret of mercury (vermillion, the gaudy pigment, is the bi-sulphuret), a dark blood-colored ore that yields quicksilver—a liquid metal. It is found in many parts of the world—Spain, Hungary, Peru—but most abundantly at the New Almaden mines, in California. The chief use of it is in the extraction of the precious metals, gold and silver from their ores; without its aid more than half would be wasted. The Spanish give it the ugly name of *azoque*; the French call it *vis argent*. Besides its use in medicine, mercury is used in gilding, silvering mirrors, making thermometers and barometers, and for many other purposes. It is put up in iron flasks, weighing about 25 pounds. It is said the Rothschild's once bought up all the quicksilver in Spain, for several years, and realized thereby several millions of dollars. The works in San Jose county are one of the curiosities of California. We think it fortunate for diseased humanity that its preparations—calomel and corrosive sublimate—are going out of use as medicines. Mercury boils at 660°, and freezes at 40° below zero. It is sometimes, though rarely, found in a native fluid state.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Sept. 23, to Wednesday, Sept. 30 1863:—

H. T. M., of N. Y., $12; E. L. M., of N. Y., $25; A. G., of N. Y., $25; J. L. G., of N. Y., $16; J. F. B., of Wis., $45; G. T., of N. Y., $20; R. A. T., of N. Y., $20; J. H. B., of N. Y., $20; E. C., of N. Y., $61; J. L. K., of N. J., $20; C. N. of N. Y., $20; O. & F., of N. Y., $20; W. D. Jr, of Pa., $20; E. M., of N. Y., $20; D. D., of N. Y., $25; F. C., of Mass., $26; L. & K., of Conn., $20; E. K., of Pa., $15; J. C, of Mich., $25; E. S. H., of N. Y., $25; J. M., of N. Y., $25; W. S., of N. Y., $25; S. & C., of N. Y., $16; H. P., of Maine, $45; S. C. S., of Ill., $20; G. B. D., of Ill., $20; C. R., of Pa., $20; W. S. D., of Pa., $90; L. S., of N. Y., $20; W. W., of N. J., $16; R. H. S., of Mich., $45; C. D., of Ohio, $20; H. A., of N. Y., $20; D. S. S., of Ind., $16; H. G D., of Ky., $16; E. P., of Ohio, $10; A. B. J. F., of Ind., $26; A. H., of Ill., $25; G. T., of N. Y., $25; J. H. R., of N. Y., $25; T. N. & J. N. C., of N. Y., $41; J. W. N., of N. Y., $20; T. J. W., of N. H., $20; W. T. E., of N. J., $16; C. T, D., of N. J., $45; J. K., of Iowa, $20; A. W., of N. Y., $45; W. M., of Mass., $30; E. K. S., of N. Y., $10; A. & G., of N. Y., $16; J. E. Van Z., of Ky., $20; W. W., of Pa., $22; G. W. P., of N. Y, $16; E. H., of N. Y., $25; G. R. W., of Conn., $44; T. B., of N. Y., $16; E. J. E., of Ill., $28; R. B, L., of Ohio, $26; W. S., of Ill., $16; S. M. P., of Ohio, $15; W. B. W., of N. Y., $25; R. L. S., of Mich., $20; D. W., of Ill., $21; J. H., of Ill., $16; K. V. B., of N. Y., $10; G. W., of Iowa, $25; A. E. McG., of Minn., $16; P. S. F., of N. Y., $25; H. W., of C. W., $20; G. & G., of N. Y., $25, H. S. W., of Mich., $20; P. C., of Pa., $25; R. E. & A. G., of N. Y., $16; J. R.; of Ind., $16; J. B., of Ohio, $16; J. B. R., N. Y., $300; S. G. W., of Ill., $25; H. H., of Pa., $25; F. S. D., of Ill., $16; W. A. S., of N. Y., $25; G. K. G., of Cal., $15; W. L. R. V., of N. Y., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, Sept. 23, to Wednesday, Sept. 30, 1863:—

H. T. M., of N. Y.; E. S. H., of N. Y.; G. T., of N. Y.; E. L. M., of N. Y.; J. M., of N. Y.; J. H. R., of N. Y.; A. G., of N. Y.; W. S., of N. Y.; T. N. & J. N. C., of N. Y.; F. C., of Mass.; E. J. E., of Ill.; D. D., of N. Y.; G. R. W., of Conn.; A. H., of Ill; S. G. W., of Ill.; H. H., of Pa.; G. & G., of N. Y.; E. H., of N. Y.; J. C., of Mich.; P. S. F., of N. Y.; A. B. J. F., of Ind.; W. B. W., of N. Y.; E & W., of N. Y.; P. C., of Pa.; W. A. S., of N. Y.; L. & K., of Conn.; H. L., of Mich.; G. W., of Iowa; L. & P., of N. Y.; W. S. D., of Pa.

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Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference ome complaints have been made that our past mode of binding in is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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Improved Cutter Bar Head.

The improvements continually going in agricultural machinery are of such a nature as to render tools of that class most efficient and reliable aids of the farmer. No sooner does a machine seem complete in all respects than the keen eye of some ingenious person discovers an opening for an improvement, which being added increases the value of the apparatus ten-fold. The engraving published herewith is an illustration of an improved method of constructing the heads which the cutter bars of harvesters or mowing machines work in. The great desideratum is to obtain a light bar, with a large wearing surface, and sufficient strength to withstand the rapid vibration to which it is subjected. It will also be noted that the upper surface of the head is smooth and unobstructed, so that grain will pass freely over it; this result is obtained by having the shank of the cutter bar head made in a taper form, and interposed between the sickle and the cutter bar, also by means of the oil cup a perfect lubrication of the working parts under it is at all times attained. The invention also relates to an improved arrangement of the slot cap and guide-way, whereby the pitman is provided with a suitable guide to prevent lateral motion. Appended is the inventor's description of the several parts, and the claim he sets up for his improvement.

Reference is had alternately to either Figure, the first being a plan in perspective and the second a section of the parts. A, is the inner shoe, and is constructed of cast-iron, and B, is the finger; C, is the steel cutter bar, $\frac{3}{4}$ of an inch by $\frac{5}{32}$ which is sufficiently strong for the work. The head, D, is of malleable iron, and has the blank section, E, cast on it to clear the grass out from under the slotted cap, F, shown in Fig. 1; while at the same time it helps to prevent the head from oscillating. The slotted cap, F, has a two-fold use, it forming a cap and also holding the pitman, G, in its place. The way piece, H, is held on to the finger bar by the same bolts that hold the finger bar to the shoe; this is nicely fitted over the top of the head, D, and is provided with an oil cup which has a cap to keep out dirt; the cover does not rise perpendicularly, a small tip being cast on the cover to prevent it from being opened by shock or jar while in operation. The merits of this invention consist in the large wearing surface on the top of the head, D; in securely holding the pitman in its place; in the arrangement of the oil cup and cover, as this lubricates the upper surface of the head, and the pitman; by working down behind, the oil also reaches the bottom of the head. The improvements also extend to the arrangement of the sections which are on the thin part of the malleable head, and on the bar, which is bent at the center of the third or fourth section, and passing down under the thin part of the head, allows it to be the full length of the bar; it is fastened to the head by two rivets shown at *a* and *b*, in Fig. 2, and with the five other rivets that hold on the first three sections; the rib, *c*, on the head, D, also giving great additional stiffness. A patent is now pending through the Scientific American Patent Agency; for further information address W. A. Sweet, care of Sweet, Bros. & Co., Syracuse, N. Y.

Fig. 1

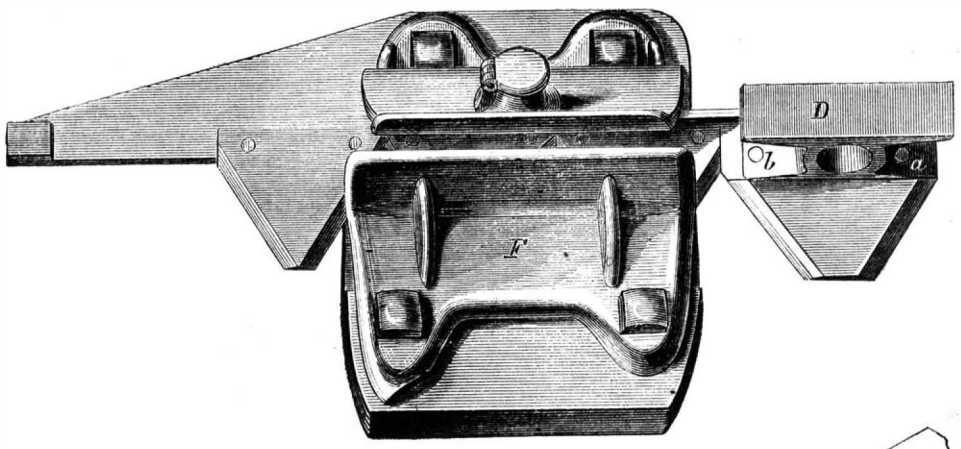
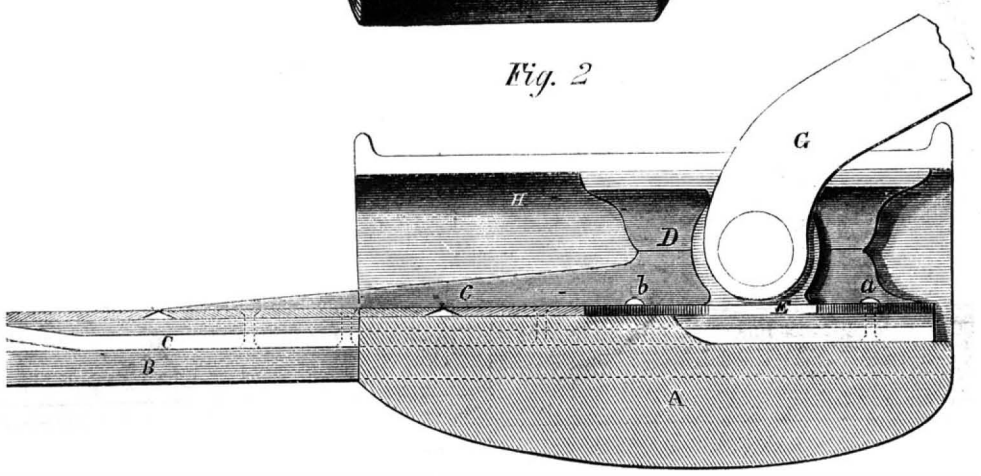


Fig. 2



SWEET'S CUTTER BAR HEAD.

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